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THE

BRITISH

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NEW SERIES.

Agriculture not only gives riches to a nation, but the only riches she can call her own.—Dr. Johnson.

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Yrs most truly Robt. Baker
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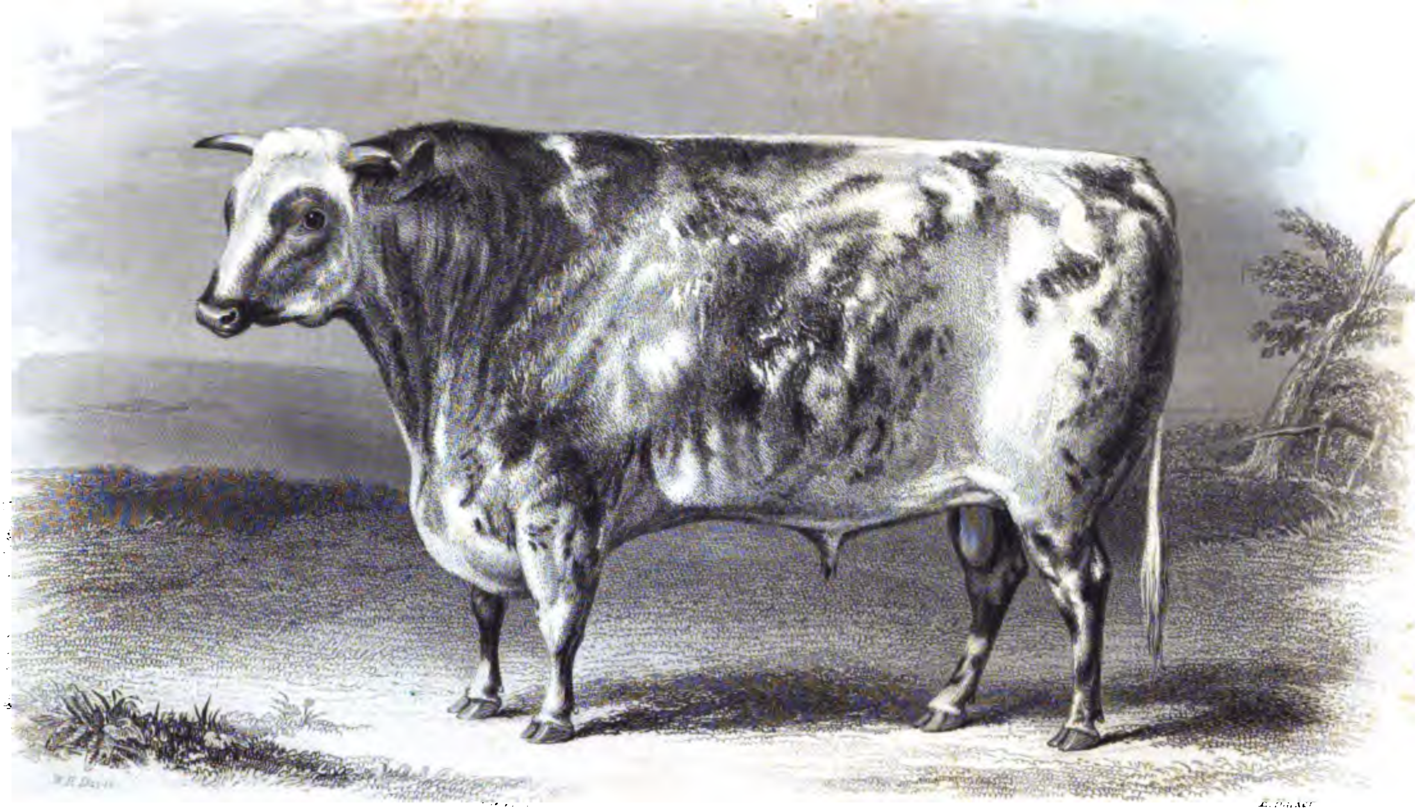

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THE BRITISH
FARMER'S MAGAZINE.

NEW SERIES.

VOL. XXVII. 1855. NO. LXXIII.

PLATE I.

PORTRAIT OF MR. ROBERT BAKER.

PLATE II.

A SHORT-HORNED BULL,

THE PROPERTY OF WILLIAM SANDBY, ESQ., OF HOLME PIERPOINT, AND HENRY SMITH, ESQ., OF THE GROVE, CROPWELL BUTLER,

For which the first prize of Forty Sovereigns was awarded at the meeting of the Royal Agricultural Society of England, held at Lincoln, July, 1854.

MR. ROBERT BAKER, OF WRITTLE.

Robert Baker, or as he is more generally distinguished, Mr. Baker, of Writtle, is essentially an Essex man. He was born at Terling in that county, in November 1793, so that he has just completed his sixty-first year. All his early impressions of life were gathered in the same neighbourhood. His first initiation into the business of the farm was made in the parish of Boreham, from which he walked three miles every morning to the village school at Terling. Subsequently to this, he was removed to a boarding-school, at Witham, where he continued to his seventeenth year, when he at once entered on that pursuit for which he was destined to do so much—the study of practical agriculture. His father at this period had removed to the Maddox Hall-farm, adjoining the park of Mr. Strutt, for many years member for the borough of Maldon; the estate having now descended to his grandson, Lord Rayleigh. It was here Mr. Baker, to use the words of one of his own favourite bards "tried his prentice hon'," and where we may conclude, he remained somewhere up to the time of his marriage in 1817. The worthy partner of his hopes and cares was a daughter of Mr. Thomas Lanbrook, of Brent Hall, Boreham, by whom he has had a family of three children, two only of which are now living. His eldest son died at the early age of twenty-four, leaving, however, a wife and four children, who have all been brought up under the immediate care of their grandfather.

Mr. Baker, as may be supposed from his general character, has been no "rolling stone." He enlisted himself in the ranks of practical farmers in the first instance at Boreham, where he remained until 1827, when, adding considerably to his previous occupation, he removed to Writtle, where he still continues; and long may he continue to prosper.

The memoir of such a man may be written in a very few words. It has been one long career of usefulness, great ability, and unceasing energy, employed from the first in doing everything to advance that interest with which he has become so signally identified. No one, at a period, be it remembered, when the fact was anything but the truism it is now, saw so clearly the necessity for that union between science and practice in the cultivation of the land; while none have laboured more earnestly to insure their co-operation. For a long series of years, the results of his study and experience might be traced through the columns of our agricultural publications. From the *Farmer's Journal* of his early days, we find him gradually succeeding to the *Farmer's Magazine*, the *Mark Lane Express*, *Bell's Weekly Messenger*, and other channels of communication, both local and general. Few writers have ever been received with more welcome or attention, for few indeed have written with more practical authority on that they touched, or with more honesty of purpose in what they advocated. He has yet even, at times, from his efforts in this direction, had his advice received by some of those he would instruct, with no better thanks than its being "only book farming." As one of the safest of our pioneers to the improved systems of husbandry, as one who knew thoroughly all he taught, he could of course well afford to withstand such a compliment. It is amusing though, to mark the difference between what his own fellows once said of him, and that the mere theorist might have later considered him. The well-profited experience, however, the sound judgement and intimate acquaintance that enabled him to urge forward the one, has served as efficiently to curb the other. There is not, we believe, a landowner or occupier in the kingdom, but who has learnt to respect Robert Baker, of Writtle; and there is none whose advice or recommendation is more implicitly taken. Calumny cannot do much before this, and though often enough assailed, rarely have any suffered so little.

Uniting with the occupation of the farm an extensive business as a land-agent and valuer, it is extraordinary the time Mr. Baker has still given to public duties. As an instance of his labours as a valuer, we may name his different surveys and assessments under the Tithe Commutation Act in 1836, when he went over upwards of two hundred thousand acres, chiefly in the county of Essex, without a single appeal against his decisions. Still, notwithstanding such demands as these, he was never unmindful or negligent of the farmer's cause. With this as his chief care, acting on the impulse of an Englishman, who is not to be bullied or libelled into submission, he was the first to enter the field against the Anti-Corn Law agitation. Anticipating as little as his opponents what really, through a chain of unlooked for circumstances, would be the result, but taking them rather at their own word, that it was a matter of little importance whether a quarter of corn was grown in this country or not—with such an argument as this to meet, Mr. Baker originated the Essex Protection Society. From this came a similar movement throughout the kingdom, concentrated at length in the National Association. We have no desire to revive a by-gone battle. It is one, still, that did no disgrace to the farmers of the kingdom; for if the event has proved how mistaken they were, it only shows how yet more so were their opponents. The agriculturist acted on the defensive, simply because he was threatened. His great error was taking his opponent at his word.

In conjunction with the late lamented Wm. Shaw, and with far better success, Mr. Baker originated the London Farmers' Club. It was mainly at his instance, we are assured, that one of its best features was developed—the monthly discussion meetings, of which he filled the office of chairman for the first two years after their introduction. The benefit arising from these "debates" is now pretty generally admitted, while none have contributed more to their value than Mr. Baker himself. His paper on "the Union between Science and Practice," was one of the very best the members have ever had delivered to them; free from all prejudice, or any one-sided view, and only tending to cement that union its author has so long advocated. Amongst other subjects, also introduced here by Mr. Baker, have been "Artificial manures, and their application," "Draining, surface and deep," "Storing root crops," "Geology, as connected with agriculture," "The converting of grass-land into tillage," "The most economical mode of thrashing grain crops," "High farming," "The effect of soil and climate on cultivation," "The economy of farming, and the diseases affecting plants and vegetables, &c."

Although not so closely identified with its proceedings, not in fact so directly as many could wish, Mr. Baker was one of the earliest members of the Royal Agricultural Society of England. He is, too, amongst its most distinguished, having gained one of its chief prizes, appropriately enough for an essay on the farming of his own county.

It is not, however, in any one certain set that Robert Baker of Writtle takes a position becoming to his merits and acquirements; there are few local societies or clubs within reach but have had the benefit of his assistance. As a judge at their shows, as a lecturer at their meetings, as one who can show in his own career how much a man may do to improve, in many points to educate himself; as such—a friend, a teacher and an example, how many have learnt to appreciate him! It is, though (as we have often before had occasion to impress in notices of this kind), to a man's home and neighbours that you must go for his real character. He whose fame will not stand the test here, cannot be worth much elsewhere. Let us follow Mr. Baker to that home and neighbourhood he has never deserted. Let us ask his good name from the gentlemen of his county, of the farmers at their market, of the labourers in his parish—everywhere alike, we will venture to ensure it; from the pupils he has made men of, to the children he has brought up, we could not search too closely. Let one fact, however, be here the best confirmation of all we might advance:—Hardly ten years since, the county of Essex, the gentlemen, farmers, tradesmen, and others, presented him with plate to the value of four hundred pounds, in testimony of their esteem for himself, and admiration of his conduct. Nearly four hundred attended the dinner at which this presentation took place, while upwards of a thousand, the subscription being limited, contributed towards it.

We need go no further. Those who know him in private life, will recognise in the sketch we offer, a truly hospitable man, a warm friend, and a most agreeable companion. Well read in all the best literature of his own language, full of quaint humour, and abounding in anecdote, his success in society is proportionately great. And yet for all this, we would class him no higher than a practical farmer. We class him as such with some pride, as one who has fairly earned the respect he commands.

DRAINAGE WATER.

BY CUTHBERT W. JOHNSON, ESQ., F.R.S.

During a recent lecture at the Central Farmers' Club, on land drainage, some brief remarks were made on the importance of employing in irrigation the water thus taken from the soil. This valuable address on drainage, by Mr. B. Denton, was of too important a nature to be done justice to in the necessarily short space allotted to him; and the same remark applies to the observations which followed on the use of the water which the skilful drainer removes in such copious quantities from cultivated soils. In this paper I propose to submit for a winter evening's consideration of the readers of this magazine a few facts relating to drainage water, its amount, and its value for irrigation.

The collection of such water in reservoirs, to be used in the dry seasons of the year for irrigating the land, is not a novel practice. In the warmer climates of the earth, the construction of large recepticles for such a purpose is an object deemed worthy of the attention of sovereign princes. Some of these abound in some parts of Persia and Hindostan, one of which, for instance, in Southern India, formed by damming up the end of a valley, is several miles in length, receiving and storing the drainage waters of a large extent of country. Even the Incas of Peru had turned their attention to the very same subject, ages before the days of Columbus.

But we need not travel out of our own country for similar instances: the same attention to the collection and skilful use of drainage or land water is discernible in many districts, as at Lord Hatherton's at Teddesley, at Mr. Mechi's at Tiptree, and on several farms in Scotland. The apparent purity of the water commonly issuing from the mouths of a land drain need not deter the farmer from its use, for the brightest mountain land-springs have been profitably used in irrigation. Mr. W. Simpson of Glenlythan, in Aberdeenshire, has detailed his operations in such an apparently unpromising elevation (*Trans. High. Soc.*) He describes the rills or streams as being supplied from several copious springs, which rise about half a mile above the commencement of one of the plots; and after running a short distance from the spring, these streams pass through a bog (now much drained, and in which other springs also rise), and all unite and form a considerable burn in one channel. Previous to the ground being operated upon for the purposes of irrigation, the stream ran through the Den in a winding course. The ground at the top of the Den consisted of a few mossy hillocks, and the other part of the ground was pretty level, of a dry nature, and covered with a short kind of grass. The ground was never cropped with grain, and the grass was not sufficient to be cut. The cattle were occasionally turned out upon it, when pasture was scarce in other parts of the farm. The soil generally, except the mossy part, is alluvial in some places, and at others gravelly. The operations for irrigation began in June, 1843; and from the detail given by Mr. Simpson, we find that from about five acres of this land, when formed into a water mead, were cut of grass in cartloads of six cwt.—

June, 1844	12
July	32
August	34
September	30
October	11
In 1845 was cut during—	
June	13
July	36
August	43
September	42
October	8

If, then, in such a place water meads can be successfully formed, let us next consider the *amount* of water likely to be collected by the drains of an upland farm; and then let us inquire whether that water usually contains any and what fertilizing matters. Now, as to the amount, we find that amid the chalk hills of Hertfordshire, from the result of eight years' careful examination (1836 to 1843), the mean rain-fall was 26.61 inches, or equal to 2,660 tons per acre; of this quantity 42.4 per cent. drained away, and 57.6 per cent. evaporated from its surface; or what is a more practical way of stating the same facts, about 1125 tons per acre annually drained from the land, and about 1535 tons evaporated from the same space during that period (Mr. Dickenson, *Jour. Royal Ag. Soc.*) It is evident, then, supposing all the water which thus drains from the land was collected and transferred to grass or other land at a lower level, that the farmer would have the power of increasing the profitable moisture of such smaller fields to almost any extent. (Let us not forget that an inch depth of rain, which rarely falls in England in twenty-four hours, is as nearly as possible 100 tons per acre.) And the farmer must not imagine that the land-water of any of his arable soils is free from fertilizing matters; neither must he forget that the more highly he farms, the more copiously his fields are manured, the more impure and valuable is the drainage water escaping from his soils.

Several chemical investigations have proved the correctness of this very natural conclusion. Of this kind were the examinations of the present professor of agriculture in the university of Edinburgh carried on in the autumn of 1844, in East Lothian. He observes (*Agricultural Gazette*, 1847, p. 461), that the usual quantity of rain had fallen during a winter fallow, when, on the 29th of April, he collected a specimen of water flowing from a land drain; immediately after this sample was taken, the field was sown with barley, and top-dressed with guano. A few days afterwards, a second sample of water was taken from the same drain. On examining these, it was found that 18lb. of the first specimen contained 15.2 grains of solid matter, and the same quantity of the second 27.5 grains. These, upon being analysed, were found to contain—

	April 29.	May 16.
Organic matter and water	3.4	7.8
Silica]	0.9	0.7
Silicate of alumina	0.4	0.2
Chloride of magnesium	1.12	—
Common salt	1.8	2.61
Carbonate of lime	—	2.7
Chloride of calcium	3.0	2.10
Sulphate of alumina	0.85	—
Peroxide of iron	2.1	2.25
Magnesia	—	1.69
Phosphate of lime	0.3	3.1
Phosphate of magnesia	—	1.8
Phosphate of alumina	—	0.45
	13.87	25.41

The turbid portion of the drainage water first discharged from the soil, after heavy rains, being examined by Mr. Wilson, was not found to differ materially in composition from the soil which it drained; it held, however, less silica and more lime, the matter deposited by the turbid water containing per cent.—

Silica	60.0
Silicate of alumina	17.5
Protoxide of iron	6.5
Sulphate of lime	9.4
Sulphate of magnesia	0.75
Phosphate of lime	0.6
Alumina	4.0
Water, &c.	1.25

In the cases to which I have hitherto referred, it is to the use of the land water, and the land water only, that my observations were intended to apply; but, as a matter of course, greater is the benefit when that land water can be mixed with richer and still more fertilizing drainage. We have a notable instance of such an effect in the Berkshire catch-meadows of Mr. Pusey, so well described by Mr. Lee, in his valuable report to the General Board of Health (*Report*, p. 81); from this we learn that Mr. Pusey has within the last few years converted about 100 acres of land lying eastward of his mansion, into irrigated meadows. The land is flat, and I cannot, says Mr. Lee, better describe the principle upon which the works are laid out than in his own words:—"The catch-meadows were used chiefly, until lately, in Devonshire. The gutters being drawn along natural slopes, the water falls from the upper one to the one immediately below, which spreads it anew equally over the surface lower down. Hence the name catch-meadow. This system, originating in an almost mountainous country, has been of late years transferred to land almost level; quite as level as any on which the ridge water-meadows were made in Wiltshire."

In front of Pusey House is a small ornamental lake of about two acres, the overflow from which supplies the upper part of the meadows; and at Pusey Lodge Farm, and Cherbury Camp, two other small streams are brought under tribute for the fields in their vicinity. The whole body of water is, however, so small, that I should think there is probably no other instance in which an equal quantity is turned to so profitable an account. Mr. Pusey says that in summer they are very short of water, and can only let the fluid penetrate six inches into the soil, so as to damp it; at that time the earth is so dry, that when the water goes in, and sinks through the worm-holes, the ground sings. In winter the operation is going on continuously in one part or other.

The geological formation at Pusey is the coral rag of the oolitic system, and the meadows in the vicinity of Cherbury Camp were, only a few years since, sheep-common, covered with emmet-hills, brambles, rushes, &c., and worth about 5s. per acre per annum.

The whole of the work has been done within the last four years, but at different times. That first commenced included the greatest amount of earthwork, and the several contracts contained diminishing quantities of labour, which will account for the differences in the following prices, with which I was favoured by Mr. Pusey:—

20 acres at £4 10s.	per acre	£90
20 acres at £4	"	80
30 acres at £3	"	90
30 acres at £2	"	60
100	Total	£320

The amount is equal to £3 4s. per acre on the average; but this did not include the sluices, which are of oak, and cost about 2s. 6d. each. In the earlier and middle parts of the work, I found these to average about ten to the acre; but in the portion most recently irrigated the sluices are not yet put down. Clods are used instead; but they sometimes burst, and always tend to deposit soil in the gutters, besides occupying much more time in placing and removing than the management of sluices would. It is but fair, therefore, to add the cost of sluices to the capital account, making altogether an average of £4 9s. per acre.

Mr. Pusey, however, is anxious that this outlay should not be regarded as representing the ordinary expense of forming catch-meadows for common agricultural purposes; as in Devonshire, the common estimate is about £2 per acre for the average cost; and a Devonshire gutterer, Mr. Dobbs informs him, has lately executed many such works in the Isle of Wight at a cost in no case, as he states, exceeding £1 10s. per acre. Draining, however, which is often required, must be taken as a separate item of expense. The cost of diverting streams and putting in sluices would also have to be added.

Before proceeding to describe the very high rate of fertility on these meadows, I ought to state that Mr. Pusey has not only used the natural fertilizing powers of the water, but has also drawn incidental advantage from any farm-yard manure or other refuse within reach of the irrigating stream. The water is dark during and after rain, from the washing of the manure of farm-yards, or of organic refuse from the houses in Pusey, and in other parts white from the washings of the roads. Mr. Pusey says, both the dark and the white waters are more beneficial than the clear stream.

As to the length of time during which the fertilizing streams are on the land, I have already said, continues Mr. Lee, that Mr. Pusey is very short of water. In hot weather, when the water is deficient, it is only laid on six hours at a time, just to run over the sheep-dung, which it melts and carries down to the roots. When the supply will not even admit of so much, the sluices are drawn for an hour or two at a time twice or thrice a week, to damp the soil. At the present time it will remain on the Italian rye-grass three days. In winter, when there is no frost, the course of the whole 100 acres is to be a week dry and a week wet; but during frost it is allowed to remain covered the whole time —a month if necessary, to protect the vegetation from cold. The operations on Mr. Pusey's estate are confined to grass crops entirely. The land had been under-drained some years previously to the irrigation in most places where drainage was required.

Of the beneficial results, Mr. Pusey says in a letter to Mr. Chadwick, speaking of the last part of the work executed:—"The land is very poor, but has this year given five crops of grass, the four first very heavy crops. There is also a promise of a sixth. I will not trouble you with the details, but moderate as is the outlay, and recently as it has been made, the land has been more than doubled for the Income Tax assessment, being raised, even in these times, a pound an acre; nor have I any reason to complain of the rise."

Before the irrigation was commenced, the herbage was what Mr. Pusey calls "carnation grass," a large, coarse, sour-looking production, disliked and avoided by cattle. The irrigation has destroyed all that, and brought instead a soft, silky, nutricious grass very similar to that on the Edinburgh meadows.

The whole of the annual produce from any of this land has not been either measured or weighed;

but Mr. Pusey said, while we were examining the part first irrigated, that two years back the first crop cut was estimated at 1¼ tons to the acre. Sheep were then turned on repeatedly, and the whole annual produce was estimated to equal the keep of 36 sheep per acre during five months.

Some sheep fed upon this land have become lame. Mr. Pusey says, that opinions are divided as to whether this lameness is attributable to the irrigation or not. I believe, however, that none have rotted. The practice of cutting the second crop, after feeding the first, before turning in sheep again, is a precaution taken to prevent that disease from appearing.

I have already spoken of the former sterile condition of the part brought under irrigation only two years since. Within that time 28 acres of it have been sown with Italian rye-grass. My informant said, that this year there had been five crops of grass, each as high as the sheep-pens. A sixth crop is nearly ready for the scythe. He added:—"If the old men who died twenty years since were to come to life again, they would never believe that this was Cherbury."

Still richer waters are employed for irrigation in Scotland; and there, too, they not only avail themselves of the drainage waters where their mere gravity renders them available, but they use—yes, and profitably too—for this purpose the pump and the steam engine. I refer to such efforts as those of Edinburgh, of Glasgow, and at Ayr. It is true that the enormous produce of grass thus obtained, when reported to the cultivators of drier meads, is such as naturally to make them incredulous, and has even in some cases excited their ridicule. But time, my readers will remember, renders us very familiar with many a firmly established profitable truth, which in the days when they were first perhaps too briefly and suddenly announced were far from favourably received. The ordinary hard fate, indeed, of those who propose sudden innovations in any art or science, always renders the timid and the very cautious unwilling to embark in such patriotic attempts; the task is commonly, therefore, reserved for the sanguine and more stout-hearted—for men of more iron nerves, possessing in general more zeal, but less patience, who tell the truth it is true, but not always in the most discreet and conciliatory manner. These, therefore, are wont to travel on amid showers of ridicule and tempestuous squalls of wit; or, perchance, with still more practical onslaughts. For instances of this, let the modern and enlightened English farmer recur to the fate of poor Jethro Tull, the great and ill-requited introducer of the drill and the horse-hoe husbandry: remember how bitterly he complains in his great work of the reception he met with; and let him not forget too Michael Mensie, the contemporary of Tull, who invented the first thrashing machine, by setting to work by machinery a set of flails; and who was not only opposed, but even execrated as taking the bread away from the laborious thrasher. But past generations were not content to use only earthly arguments to intimidate the rash innovators, who dared to move on in advance of the knowledge of their age; it was even earnestly contended, when A. and R. Meikle first introduced the winnowing-machine, that the use of such fans was a very wicked imitation of the wind, with which, for cleansing their corn, former generations of serious-minded Scotch farmers were so long and so gratefully content.

ON BRITISH AGRICULTURE, WITH SOME ACCOUNT OF HIS OWN OPERATIONS AT TIPTREE HALL FARM.

By I. J. Mechi.

[The following paper was read by Mr. Mechi at a meeting of the Society of Arts, on Wednesday, December the 6th.]

This is the fourth time I have had the honour to appear before our Society; but I offer no apology, because I believe that there is no question at the present moment so important to the national welfare, as the attempt to increase our supply of food by improved British Agriculture. The stomach brooks no delay; and, unless duly supplied, there is an end at once to art, science, commerce, and manufactures; honour and glory succumb to short commons. When this country was purely agricultural, and we exported corn, our anxiety was about clothing and manufactures; but now that mighty steam and scientific appliances have enabled our mechanical millions to envelope the world in cloth and calico, and now that this vast and increasing population has outstripped the limited acreage of our little island, the question of food enough by home-improvement, or by foreign supplies, has become one of vital import. There is something of stern admonition in our present food position. With an abundant harvest, for which we have just returned grateful thanks, the price of corn is enormous. An abundant home-harvest is not now enough for the increased population; and, therefore, because some of our foreign supplies are cut off by accidental circumstances, Consols are depressed; confidence is withdrawn; circulation contracted; trade, commerce, and manufactures are paralyzed, with a prospect of much individual suffering and privation. I venture to assert, from my own experience, that we could grow more than all the food that is required by the British people; but it must be done by investment and improvement. The mere drainage of all the land that requires it would add millions of quarters of corn, and much additional meat to our present supply. My own farm may be taken as an instance of greatly and amply increasing our food supply. I therefore purpose this evening to lay before you my own agricultural balance-sheet, which is again highly satisfactory and remunerative, showing an advantage to me in rent and profit of about £750. I shall glance at the progress of British agriculture, and enter into some details connected with its internal economy, thinking that such information may be a useful preparative for those who, like myself, hitherto engaged in other pursuits, may be disposed to divert some portion of their capital to agricultural practice and amendment. I do not know anything more rational and more desirable than that the surplusage of our town and city profits should find useful employment on the land. It is much needed. The agricultural cry is always, "But where is the money to come from for these great improvements?" and therefore every landlord and tenant should rejoice at an increase of "apron-string" farmers and improvers, seeing that the inflowing of capital and intelligence diminishes rates and increases profits and comforts in a thousand various ways. If I were to ask "why so little town capital finds its way to agricultural improvement?" I should say, you have hitherto not held out to it the hand of invitation. Great landed proprietors, with poor, unimproved and entailed estates, either from want of knowing that means for their improvement exist, or from a false delicacy as to borrowing the money, or from a disbelief or doubt of the improvements resulting profitably to themselves and their tenantry, have not generally availed themselves to any extent of the two or three existing companies which have the means and legal powers to effect every necessary amendment, even on strictly entailed estates. I know a great many small landholders whose property and tenantry would be equally benefited by such investments. In a national point of view, it would be highly desirable that some hundred millions of our surplus capital should be engaged in producing British food on British soil by British means and labour*—rather than that the cash-boxes of our capitalists should be crammed with bonds and responsibilities from every foreign nation and foreign undertaking—to the very casting of Russian cannon to be used against our own troops. I could readily point out how one hundred millions could be at once *profitably* employed in agricultural amendment. But ere this can be done there is an immense amount of prejudice to be removed, and self-satisfaction to be disturbed. This is not an age of impossibilities—on the contrary, steam, gas, railways, electric telegraphs, Britannia tubes, suspension bridges, and chemical discoveries, which were all once considered visionary, have become realities, working immense changes, and affecting largely the comforts and intelligence of our own country and of the whole world. I venture, then, to predict that, in a comparatively short period, we shall see every farmery covered in with sufficient shelter for its stock, lighted with gas, its fixed steam-engine, economizing the costly labour of horses, and warming by its waste steam the various sheds. The food which the farm produces having done its office in the town will run back to restore the fertility which it had exhausted—our land will be drained and irrigated—the residences will be worthy of a more intelligent tenantry, possessing greater capital, and rejoicing in pianos and libraries. The waste and loss occasioned by misplaced buildings, bad roads, and queer-shaped fields, will be corrected by the facile sale or transfer and interchange caused by an easy legal registration. It is a great point to provoke people to *talk* about such matters, causing first a little wonder, anger, disbelief, inquiry, and ultimate calculations and conviction. Our British agriculture must progress with the other interests of the country. I often, on a summer's morning, before the business of London commences, take a reflective stroll, and ponder on our rapid increase of wealth and intelligence, as evidenced by our new and magnificent streets and buildings; queer, old, quaint buildings are swept away, and you see rising in their room business palaces, involving enormously increased rentals, and built of stone and iron, as if never to decay. This is real economy where there is capital, and I naturally, on these occasions, wish that I had on either side of me the prejudiced defenders of our rotten and inefficient farmeries, exhibiting in their decay the rotten thatch and dripping eaves—the beau ideal of rustic landscape. If we have capital in this country—and who can deny that we have it in superabundance?—let it avail to give to agriculture a higher and more dignified, more intelligent, and, consequently, a more profitable position. The clumsy appliances and prejudiced neglects of antiquated agricultural customs are *not* profitable. The men who now suffer most in agriculture are precisely those whose ill-farmed, wooded, small, and undrained fields, and unimproved buildings, are slowly but surely absorbing the tenant's capital, binding him in poverty and discontent. It will be a happy day for the tenantry of this country when their rents are doubled, provided that increase represents a proper interest for necessary improvements. This takes place in our towns and cities—why not in our agriculture? I do attach much importance to the application of our town sewage to agricultural fructification. It is going on rapidly in various quarters; and I have been delighted to find that my intelligent and calculating friend, Mr. Samuel Brooks, of Manchester, has placed at the disposal of the Managing Council of that city the munificent sum of one thousand pounds to be expended in prizes or means to obtain the best mode of applying the sewage of that city to the fructification of the surrounding country. My own experience in this matter, with two miles of pipe on my farm, convinces me that the engineering difficulties are perfectly insignificant, and that a nation which has passed its iron railways through every man's house and property, *nolens volens*, for a useful general purpose, will not be deterred from acting similarly in the great question of feeding the British people. We have local commissioners for superintending the drainage of our fens, and why not for irrigating with our town sewage? I will not insult this meeting with details on so simple a question, for pumping and conveying manure is no other than diffusing water, every fractional detail of which is perfectly well understood, and can be at once readily calculated. One thing is quite certain, that you must convince landlords and tenants that manure liquefied is *better* and more available than *solid* manure; this it will take some time to do. And you must also convince engineers that they do not at all know at present the greediness of soil for manure; for if they did, a recent writer in your Journal would never have made the mistake of over-estimating some *thirty times* the area that would appropriate the sewage of the metropolis. Our excrement is literally our food, disagreeable and disgusting in form and smell, but unaltered in elementary value. Injurious to man, it is vitality to plants; and much of the luxuriant vegetables that grace our table are a mere embodiment of our own excreta. The time is gone by for false delicacy in these matters—we must entertain this great privy question. The Chinese would be starved, did they follow our example; but that wise people economise with rigid care that which they alone depend upon for the reproduction of their food. I am informed they do not, as we do, fatten cattle at a loss, with purchased food, to produce manure for the growth of corn. In order to form some idea of the extent to which our food might be increased by the application of town sewage, let us consider that 300 sheep on a farm of 100 acres would keep it in a high state of fertility, and that, therefore, reckoning 450 men, women, and children as equivalent to 300 sheep, our population would fertilize 500,000 additional acres. I say nothing of dogs, cats, parrots, canary birds, and horses—they consume largely, each horse consuming the food of 8 men; then you have enormous supplies of waste blood and offal, and a thousand other things that should add millions of qrs. to your food. The mere disintegration of your alkaline granites by the abrasion and trituration of traffic—the carbon, or smuts from your roofs, which is but too perceptible after a shower, are all sources of fertility. Amongst the coming improvements in agriculture, is—

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* By companies, or by an improved law of partnership.

Cultivation by Steam.—On public grounds, I expended some money in the construction of Mr. Romaine's machine. Our trials with it were only partially successful; we had too much velocity, and too little steam. The act of raising the soil must evidently be by a slow steady motion. Enough, however, was shown, to prove that cultivation by steam will soon be the order of the day: several parties are engaged upon it, and I have a strong impression that Mr. Usher's, of Edinburgh, will not be one of the least successful. I find there is one at work in Germany, of which a drawing lies on the table, for your inspection. I think Mr. Romaine's has an advantage, by the attachment of horse-power in the case of undulating surfaces; but I need hardly tell you, that it requires an immensity of time, and no small investment of capital, to bring new inventions to perfection. The Royal Agricultural Society of England have very properly offered a premium of £200, which will no doubt develop many attempts. When we consider that the farm horses consume the produce of nearly one-fourth of the arable land of the country, and when we calculate for how few hours daily they can be kept at work, the whole question is one of great importance to agriculture and to the nation. I hope now that *Agricultural Statistics* are becoming acceptable, that we shall have comprehensive details of the number of acres undrained, and otherwise imperfectly farmed, amount of steam power employed, number of acres under lease or annual tenure, customs of valuation to incoming tenants, extent of irrigation, number and position of cottage residences, and other details, necessary to form sound conclusions as to the present condition of British agriculture. As there are, no doubt, several in this meeting, who may hereafter desire to enter upon British agriculture, I think it will be useful to lay bare its internal economy in a popular and simple form, unincumbered with tedious details. Farming, although a most agreeable occupation, is notoriously a slow business, attended with small profits. Fortunately it is so, otherwise our towns and cities would be comparatively deserted. Yet, how desirable it is that the surplus profits of trade, commerce, and manufactures, should flow into the lap of poorer Ceres, to develope her powers and increase her riches! One thing is quite certain—that if high farming is slow, unimproved farming is ruinous.

Arithmetical Analysis of the Economy of Farming.—There is nothing more difficult than to obtain from farmers a statistical detail of the cost and return of the various branches of their occupation. Comparatively few keep books—nor do they appear to have considered it necessary to investigate details. (By-the-bye, I know a great many tradesmen who have much to revise in this respect).

Farming Capital.—I may, perhaps, be permitted to say, generally, that to farm 400 acres of land you should have at least £5,000, or £12 per acre: but if you are to carry out subterranean irrigation, and all the modern improvements, you will want £6,000 to £7,000, irrespective of landlords' improvements, for building, drainage, &c. You will then be in a condition to avail yourself of opportunities to buy, when you see anything cheap, and to sell when things are dear. I assume that you have judgment and a thorough knowledge of your business in all its details; for, unless by yourself or others acting for you, the most is made of everything, you must expect to lose your capital. There always are, in every market, men of extraordinary powers, ready to absorb the injudicious or uninformed. Look at my own live stock account—if [five per cent. mistake were made in buying and selling it would derange my balance sheet to the extent of £250.

Farm Profits.—As a general rule, ten per cent. on the capital invested is considered a very good profit in farming. There are thousands who do not realize half of it; here and there a man of extraordinary powers and great personal economy accumulates a large fortune—but it is the exception, not the rule. A return of four rents per acre is generally considered satisfactory—the average of the kingdom is, I think, less. In cases of improved farms it is sometimes five rents, or more. The necessity for diminishing the fixed expense by an increased produce is illustrated by the statement of a first-rate North-country farmer, who says, that if he spends £1 per acre or £600 a-year for artificial manures, he makes a profit; if he omits it, he makes a loss. If stock is too dear, or you are short of capital, plough in green and root crops—particularly on heavy land.

Disposal of Capital.—As a general rule, your capital will be absorbed as follows:—

	£	s.	d.	
Valuation	2	10	0	
Live stock	2	0	0	to £6 0s. 0d.
Implements	1	0	0	
Labour	1	15	0	to £2 5s .0d.
Seed	0	10	0	
Tradesmen's bills	0	5	0	
Rent	1	10	0	
Poor rates, tithes, &c. ..	0	10	0	
Artificial manure	1	0	0	
Farm horses	1	0	0	
Personal expenditure....				
	£12	0	0	

Farmers have generally the advantage of house-rent free, although too many of our farmeries are entirely unfit for a tenant of capital and intelligence, who will seldom enter upon such occupations. Supposing we take a farm of four hundred acres, on the four-course or mixed husbandry system, we shall find that one-half the farm produces nothing in the way of profit, but, on the contrary, leaves a considerable charge against, or upon the remaining half, which is in corn. For instance, the horses consume one quarter of the farm, the sheep and cattle consume the other quarter; and you will find, if you give your live stock much oil-cake or corn, that the whole of the expenses of one-half the farm have to be paid by the other half, which is in corn—and whether that corn is at 40s. or 80s. per quarter makes a very serious difference to the occupier:—

Example.—400 acres (minus fences, buildings, roads, and waste, for which the tenant always pays rent) really 380 acres.

50 acres in clover
30 acres in beans
20 acres in pasture
40 acres in tares, rye grass, &c.
50 acres in roots
100 acres in wheat
90 acres in barley and oats
380

It follows then that your 190 acres of corn have to pay two rents; two tithes; two rates; two manual labours; two seedlings; two tradesmen's bills; and merely make a polite bow to the other half of the farm for the manure left by the consumption of its crops. Now, it seems very ungracious that when you have grown a splendid crop of turnips, at an expense of £7 to £10 the acre, the sheep are to consume it, leaving you nothing but the price of the hay and cake you gave them with it; but it is a system that cannot be avoided until you find some cheaper sources of manure. The man who does not feed off his green crops, but attempts to steal extra crops of corn, soon impoverishes the land and himself too. All our most successful farmers are large purchasers of cake and artificial manure. But if manure is so costly to produce, how important is it that not one drop or atom of it should be wasted, or allowed to run down the ditches and road-sides with every shower! Amongst the evidences of enlightenment and improvement of the present day, is the introduction of covered homestalls or farm-yards, where the animals and manure are both sheltered from adverse weather. This is one of the paying moves in agriculture. But to return to live stock; a reference to my balance-sheet will confirm what I have stated. After paying for purchased food, shelter, and attendance, the sheep and bullocks left a mere nothing for the cost of producing some 70 acres of fine roots and green crops. Owing to my system of managing live stock, I never have disease; but when I find Insurance Companies charging 20 per cent. for insuring animals, it is an evidence of ruinous mismanagement, and would form a charge on my farm of £200 per annum. In pastoral and dairy and cheese districts, where a suitable soil and climate combine to produce a natural fertility, live stock may be reared, or sustained with advantage on the natural produce; and I believe in parts of Scotland the turnip is produced more cheaply and nutritiously than elsewhere, owing to the climate; but my remarks will apply to a great portion of this kingdom, especially where the rainfall is under 26 inches, and the climate dry and suitable for cereals—as on the Eastern and South-eastern coasts. In such districts, the retention of poor worthless pastures is a great mistake, and they should give way to a mixed husbandry. On the subject of live stock, I once asked a Lincolnshire farmer, who consumed £500 worth of cake annually, how he charged it. "Oh!" said he, "I charge half to the bullocks and half to the manure." As a general rule, when we are buying sheep for fattening, we pay one penny per pound more for them than we could realise for the same weight when fat. This is the penalty we have to pay to the breeder, who has to provide the bone and offal in the animal. Breeding is not all profit; for it robs the corn side of the farm, unless much purchased food and manure is used to restore the balance. But to return to my 400-acre farm. Now I have no doubt this statement will startle many a practical farmer, and will raise a storm of indignation amongst stock-feeders and stock-breeders; but the naked truth is best told, which is "that live stock are necessary evils, mere manufacturers of manure, and unattended with any direct profit;" that if you give them cake and hay while feeding off your turnips and green crops, the return for these green and root crops will be "nil," and their cost must be charged to the corn crops against the manure. I am firm in this opinion, not only from my own extensive stock feeding, but from an extended observation, as well as by the undeniable proofs recorded by Mr. Lawes in the *Royal Agricultural Society's Journal*. It is a want of this knowledge or belief that leads to so much vexation and disappointment. I remember receiving an inquiry, from a novice on farming, how much the bullocks should leave for his roots and hay. I told him if he gave them much cake he would get nothing for his roots, and about two-thirds the market value of his hay. He evidently was not prepared for this, and suspected foul play. He has since retired from farming in disgust. Another correspondent wrote to state he was about to prepare for the accommodation and feeding of a large number of pigs, as a matter of profit. I told him the only profit he would get would be the manure, which would cost him a loss of 10 to 20 per cent., including attendance, casualties, &c. Of course, he thanked me, and gave up all idea of making a fortune by pig feeding. The same remark applies with increased force to poultry, which should only be in sufficient number to consume the waste corn. Now there is nothing loses so little as a pig, because he makes a quick return, and you get paid meat price for his skin, which is not the case with other animals; his offal is also valuable. I find, with a very extensive practice, that with fine heavy barley at 30s. per quarter, and pork at 6d. per lb. net, pigs will "clear their teeth," or pay for their food, leaving attendance, housing, and casualties as a charge against the manure. This agrees with the Suffolk saying that a bushel of barley, 56lbs., will make a stone of pork (8lbs.) For fattening pigs nothing beats one-third peameal, two-thirds barleymeal, and some milk, if you have a dairy. I am particular in enlarging and insisting on this important question in agriculture, because there is much mistaken opinion about it; and even the editor of the best Scotch agricultural periodical (*The North British Agriculturist*) will continue to assert that live stock will pay, irrespective of manure.

AGRICULTURAL VICISSITUDES.—Three years ago, when I had the honour of addressing you, wheat was at 38s. per quarter, and agriculture gloomy and desponding. Now wheat is at 78s. per quarter, with an abundant harvest, and agriculturists happy. Those who will refer to my predictions at that period will admit that I was a true prophet. I will not detain this meeting with details; but will refer you to "Norfolk Agriculture," by Bacon, a most valuable book, where you will see many honest farming balance-sheets, exhibiting all the phases of agricultural prosperity and adversity. You will there see (page 99 and 100) a difference of £1000 between a "good year" and a "bad one." It is precisely these strange agricultural vicissitudes that should teach us wisdom. They always have occurred, and they always will occur. A wise agriculturist will, therefore, when things are palmy, put by a little to meet future difficulties, and not invest his happy balance in enlarged holdings, which may hereafter be a dead weight and loss in times of difficulty. On a farm of 400 acres of highly farmed arable land, the discrepancy in price between the two periods would be enormous. Take the 200 acres in grain, the difference would be something like £1,500. If I were to advise you, I would say never take a farm that is not thoroughly drained, more particularly if of heavy clay: the alternative is one of profit or ruin. I know so many estates where I see the tenant's capital wasting away under the evil influence of undrained clay, that it is quite a painful consideration. I am prepared to prove that if a tenant will pay his landlord 5s. per acre extra, or 5 per cent. on £5 per acre drainage, the gain will, in various ways, far exceed the charge. I will illustrate this. A tenant of mine, at the expiration of his lease, appealed for a reduction of rent. I declined acceding to it. I said if I reduce your rent 5s. per acre, that will be the whole amount of your gain; but if I drain your strong clay four feet deep, at an expense of £5 per acre, it will, particularly in wet untoward seasons, increase your crop from eight to twelve bushels per acre, or in money from 20s. to £4 per acre. I saw by a certain expression of countenance, that he doubted the benefits of deep drainage in strong soils; but he said, "Suppose we try one field." Well, we did try one field, the drains poured forth their volumes of water after rain, the surface was dry and easy to work, and the crop succeeded where it had always before failed; this led to the drainage of other fields, and then came a covered yard or shed, on the same terms. The result appears already—a property more valuable to the landlord, and more marketable—more remunerative to the tenant—and certainly more useful to the country at large. The neighbouring farmers watched the operation, which I believe was not without its influence on their proceedings and sentiments. The farm was a small one of thirty-two acres; I had previously removed a five-acre wood, and sixty great oak pollards. The covered yard, with feeding places and conveniences, cost £105, with slated roof. Formerly it was farmed at a loss—now it will be profitable. There is something very distressing in seeing men full of hope taking unimproved farms, and plunging into destruction; they are "booked" by the knowing ones on their first entrance, with a "Ah, poor fellow, a very few years on that nasty soil will settle him." I may be asked why I attach so much importance to drainage. Why you might as well ask me why I attach importance to circulation, vital or monetary. Stagnated water, or stagnated air, are as ruinous to the plants as they would be to our own vitality. Fix a cork in the drainage hole of your flower-pot, and you will soon have a practical illustration of my meaning. The sallow and bilious plant (like many turnip crops I know of on undrained land) will show by their expression what is denied to them in speech. This is not the occasion to enter into a subterranean examination of gravity, capillary attraction, aëration, or filtration, much less of all those affectionate or repulsive interchanges, that turn air, water, and earth, into food for man and beast; but be assured, circulation is vitality—stagnation death and ruin. It has often been asked of me, by townsmen, "why so few farmers become bankrupt?" and they are apt to infer from this that it is a very profitable occupation. The law does not prevent it, because the mere purchase and sale of a sheep in a market constitutes him a trader. Let me explain it: there are certain things of value in every farm which you cannot seise, and which will defy the powers of the most alert sheriff's officer. He cannot carry off the hoeings, ploughings, and drillings, vegetating seeds, juvenile plants, incorporated manures, and a score of other invisible things that constitute "a valuation," and which seldom amounts to less than two years' rent, or two pounds per acre—very often much more.

Farming is in England too much of a ready-money business. You walk into a market, and settle with the ready cash. But supposing you have a complaisant banker, there is no concealing the declining state of your exchequer; you cannot hide stacks in drawers, or make "dummy" bullocks and sheep; there is hardly a bumpkin in the village who cannot take your exact financial measure. It is in vain that you plead that the early disappearance of your stacks is because you want the straw. No! the poor declining farmer has no chance of "making a pocket," or obtaining a bankrupt's allowance during the winding up of his affairs. The whole thing is simple and winds itself up—the unfortunate comes out pennyless, glad to take a bailiff's place at fifteen shillings to twenty shillings per week. I have been painfully reminded of the unprofitableness of farming, by the innumerable applications I have received for employment, from men who had farmed largely and deserved a better fate. I recently asked a valuer, how many farmers failed, and lost their capital—whether more than fifty out of one hundred did not do so? and he admitted that it was so. I may be asked why is farming so unprofitable. I reply because it is unimproved, or because there is no valuation for improvements.

Agricultural Power.—I lay down as a great axiom in agriculture, in the mere question of physical labour or power, independent of skill, that steam is cheaper than horse, and horse cheaper than man. A steam horse costs 1s. 6d. per day, and will do as much work as two real horses. A real horse costs 2s. per day (including harness, shoeing, &c.), and a farm labourer nearly the same. But as a good horse weighs 1,600lbs., and a man only 160lbs., the power being as from eight or ten to one in favour of the horse, it follows that horse-power is considerably the cheaper, probably (including the necessity for manual superintendence) as four to one.

This brings me to the fearful question: What portion of the acreage of this kingdom do farm-horses consume? I answer, Nearly one-fourth of all the arable land in the kingdom. In ordinary arable culture, where there is little permanent grass, it requires four farm-horses to 100 acres. Each of these horses will consume, on the average, from five to six acres, landlord's measure, which includes hedges, roads, waste, farm-buildings, &c.):

42 weeks.......... 84 bushels oats
157 trusses hay, or 78½ cwt.
10 summer weeks (no corn) will clear 2½ acres clover.

This will be found to amount to 10s. per week, or £26 per annum, and will be the produce of about six acres, at £4 10s., or four rents per acre. I speak, of course, of average land, rented at 20s. to 22s. 6d. per acre, ordinary farming. Many farmers give oats all the year round. On very poor farming, like some I know of, ten acres would hardly keep a horse; whilst on very high farming (especially on the irrigation system), one or two acres would suffice. This brings us to consider the imperious necessity and advantage of forcing from the land its utmost possible development. If one acre will keep a horse, there is only one rent, one tithe, one rate, one seeding, and so on; but all these are multiplied from five to ten times by middling and bad farming.

Those who have watched the discrepant productions of three tons or fifty tons of green food per acre, can at once apply my observations.

But a great economy may be effected in horse-kepe by crushing the oats, cutting the green food, and mixing with it a proper proportion of straw, &c., instead of turning the horses out to trample down and defile their food. On the whole, I think we may congratulate ourselves on a considerable advance. Facility of intercourse, and ventilation of the question by public meetings, remove, both on the part of landlord and tenant, many erroneous and antiquated prejudices.

In conclusion, permit me to state, as a result of a very minute investigation of the facts, that there is ample scope for a noble future in our British agriculture; that the same principles apply to that as to all our other branches of national industry—that self-satisfaction and immovability are ruin, but that a rapid availment of science, capital, and amendment is wealth and profit; even leaving out of consideration our higher duty as providers of the food and employment of the British people.

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BALANCE SHEET.

Dr.

To valuation, 31st October, 1853—

	£	s.	d.	£	s.	d.
Horses	74	0	0			
Pigs	255	6	0			
Sheep	448	0	0			
Cattle and cows	239	10	0			
Implements	390	12	0			
Tillages, hay, &c.	471	18	9			
				£1,879	6	9
Rent of chapel land				45	0	0
Tithes, rates				75	0	0
Labour, including engineer, bailiff, &c.				450	0	0
Guano, bones, and superphosphate of lime				100	0	0
Seed-corn and seeds				50	0	0
Live stock bought				1,619	0	6
Corn and cake for feeding purposes, horses' keep, &c.				1,021	10	9
Coals for engine, tradesmen's bills, &c.				160	0	0
Interest on irrigation pipes, 7½ per cent.				55	0	0
				£5,454	18	0
My improved rent, 36s. per acre	£240	0	0			
Profit	517	15	0			
				757	15	0
				£6,212	13	0

Cr.

By valuation, 31st October, 1854—

	£	s.	d.	£	s.	d.
Horses..................	140	0	0			
Pigs, &c..................	181	14	0			
Sheep	555	2	0			
Cattle and cows............	189	10	0			
Implements................	390	12	0			
Tillages, hay, &c.	542	6	7			
				£1,949	4	7
Wheat, 4 qrs. 6 bush. per acre, 70s.—50s..				831	5	0
Barley, 7 „ „ 35s.—16s..				196	0	0
Beans, 5 „ „ —18s..				100	16	0
Oats, 13 „ „ 28s.—12s..				218	8	0
Produce of cows and poultry				50	0	0
Hay sold				—	—	—
Horse-work, labour, hay, manure, &c., for private establishment				90	0	0
Live stock and wool sold...............				2,576	19	5
200 tons of mangel wurzel, to be sold to London cowkeepers, 20s..............				200	0	0
				£6,212	13	0

LIVE-STOCK ACCOUNT.

Cr.	£	s.	d.
To valuation, 1853	1,016	16	0
Corn, cake, and feeding-stuffs bought......	1,021	10	9
Live stock bought (including 2 horses)	1,619	0	6
	£3,657	7	3
Dr.	£	s.	d.
By valuation, 1854	1,016	6	0
Live stock and wool sold...............	2,576	19	5
Loss, independent of the root and green crops consumed......................	64	11	10
	£3,657	7	3

The quantity of green and root food consumed by the stock is estimated as follows (this includes the keep of six farm-horses):

12 acres of mangel wurzel.

6 acres of Italian ryegrass, well irrigated, and five times cut or fed (a very heavy crop).

A good second growth of clover, irrigated, about nine acres.

A first growth on eight acres.

20 acres of tares and winter oats.

16 acres of good white turnips and swedes.

The straw of the farm.

5 acres of pasture.

Grinding meal, attendance, interest for shelter, &c., may be considered as a set-off against the horse-keep.

In the discussion which followed, Mr. Sidney considered that Mr. Mechi did not do justice to the improving spirit of the farmers of England, whom he instanced as availing themselves of all really useful improvements. Mr. Moore advocated the application of the sewage of towns to the purposes of agriculture. Mr. Oakley insisted on the system of box-feeding, for the production of the best manure. Mr. Davis especially recommended the cultivation of Italian ryegrass. Mr. Caird thought that good farming was still rather the exception than the rule. Mr. Morton dwelt upon the economy of labour, and Mr. Mechi's honesty as a teacher. Colonel Challoner, thinking they were all very much indebted to Mr. Mechi, proposed a vote of thanks to him; seconded by Mr. Wren Hoskyns, who reverted to the use of sewage manure, which he thought could be most conveniently applied in a dry and "fixed" condition. The Chairman, Mr. J. B. Lawes, in putting the vote of thanks, was of opinion that at the present time we had not sufficient experimental evidence to prove the economy of converting the manures of the farm into the liquid form, and thus distributing them over the land.

CHRISTMAS PRIZE MEAT.

A dead meat report of the whole of the fat stock exhibited at our Christmas show in Baker-street, as to how they have turned out when slaughtered, would be no less profitable than interesting; but the task is far beyond our reach, the demand from the provinces being so great. Happily, however, we have the gold-medal ox, an animal of extraordinary merits, with the gold-medal sheep and pigs, and also the first prize Devons, more than usually fine, the quality of their meat justly entitling them to the prominent place which they occupy both in the classification of stock by the Royal Agricultural Society and the Smithfield Club; together with the first prize Welsh ox. It was generally admitted, in the Bazaar, that the lots we have just mentioned have more than ordinary claims upon us, and therefore we shall endeavour to notice their respective merits separately.

The Duke of Rutland's gold-medal ox, bought by Mr. Ford, butcher, Kenton-street, Russell-square, will long be quoted as one of the *finest* specimens of the short-horned breed. Viewed from before or behind, we do not remember ever seeing an animal fill the the square so well; and although a little deficiency of chine, more from irregularity in the development of meat, and long standing on his feet during the attendance on two shows, than from frame, and apparent flatness of the rib immediately behind the shoulder, arising from the extraordinary thickness of the meat above and below—especially on the top of the chuck and mid-rib, as we by-and-by shall see—rendered the dignity of his *contour* somewhat less prepossessing when seen under a side-view, yet the greatness of his depth throughout, fineness of bone, and thickness of meat on all the more valuable parts, did far more than compensate for these shortcomings, enhancing his real merits the more fully they were examined, indicating him to be what he has subsequently proved—an invaluable ox.

With regard to breeding: from the best accounts we have received, he is a very judicious cross of pure shorthorn bloods, exemplifying much of that exuberance of growth experienced between crosses of different breeds. This is only what may be attained and expected, under judicious management, from the great variety of short-horned herds now in the country, and the consequent great distance which exists between them and a common parentage; and the successful result before us is deserving of the most serious consideration of every breeder and feeder of this invaluable stock. We are glad to perceive that a general interest is being taken in his merits, and hope that at all our annual sales the Duke of Rutland's gold-medal ox will be duly remembered. Got by Sir C. Knightley's Admiral Cobden (8808), his dam by Wynford (7735), a bull of Mr. Wilkinson's, of Lenton, and farther descended from the herds of the Marquis of Exeter, and Mr. Champion, of Blyth, Notts. In fact, tracing him down to Vesper (663), a son of the celebrated bull Comet, sold at C. Colling's sale in 1810 for 1,000 guineas, the pedigree of the animal is highly instructive, showing that good breeding is as favourable for the butcher as the farmer.

His carcase, again, shows his constitution to have been of the highest order; the fineness of the quality of bone, muscle and fat, proving that the food consumed had been turned to the best account; while his docility during the period of the show, and the comparatively little injury sustained on the carcase, also prove that his nervous system stood equally high in the scale of merit. Although the weather, for instance, was extremely unfavourable when slaughtered, his fat is, nevertheless, comparatively firm and finely-coloured—so much so, that few would believe he had been fed on oil and linseed-cake. On the contrary, the fat of the carcase looks more as if he had been fed on corn and grass only, so perfectly is the oleaginous matter manufactured. The lean, again, is so finely grained, coloured, and fully developed, that we could have sold a hind-quarter to a butcher of the neighbourhood for the prize Scotch beef, and who blushingly excused himself, on learning his mistake, by saying he had just been examining a shorthorn ex Baker-street, so soft, oily, and badly-coloured, that he had no idea of such differences of quality existing among extra fat stock. At the same time, it is but justice to remark that the fat must have suffered considerable deterioration in quality, owing to the great waste of it which has taken place, as we immediately shall see, since the animal left home. The kidneys are not very thickly covered; but although some of the trade are alluding to this as an unfavourable index, we beg most respectively to remind them that too much fat upon the kidneys, like too much upon the liver, may be a symptom of disease, and that a moderate supply is the best index of good health, constitution, and well-mixed carcase, and that when "wasting" takes place this is always the part which suffers most, especially in cases of this kind, where it is under good health and absence of fever.

All that we can say is, that it would be highly unfair to impute to the animal what belongs to management experienced between Belvoir Park Farm and Mr. Ford's slaughter-house, where he has been nearly a month on his feet during his attendance at the Rutland and Smithfield Club shows, losing fat all the time.

The thickness of meat on the different parts, the proportions of fat and lean, and weight of the different qualities, are topics requiring more space to do them justice than we have at our disposal. The loin and chuck-rib measures each about twelve inches through at the thickest part, and the mid-rib from nine to ten; while the thin flank is eight. It is this great depth of meat on these parts, together with the long standing, which made the ox look a little hollow on the back between the fore-rib and loin, and flat upon the side, as already stated. It is seldom that shorthorns are so thick on the chuck-rib and mid-rib. The round or buttock, again, is from thirteen to fourteen inches through, girthing about forty.

The quantity of lean meat in this great thickness is even greater than we expected; while the fat and lean are generally well mixed. That there is a considerable excess of fat, upon the whole, need not be concealed; but from the manner in which it is mixed with the lean, there has been no waste to the butcher, and as for the cook, it will only amount in the majority of parts to an important economy of lard.

The weight, again, of the finer parts—as the rump, loin, and fore-rib—is great, while the thickness and quality of the meat on the mid-rib and chuck-rib, with the extreme smallness of the bone, bring them nearly on a level with the first quality. The smallness and fineness of the quality of the bone has been the just admiration of every one. Mr. Ford several times drew our attention to this, remarking that he never, during his long experience, saw so large a proportion of meat to the bone, the weight of the latter being so little. The thin flank and brisket, weighing about 27½ stones, and long crop, 26 stones, will make capital broth. In short, from the loin to the leg, the noble animal we have thus briefly noticed was truly "a butcher's ox" in the stall, with all due respect to the maxims and phraseology of the trade, relative to the technical meaning of this quotation; for had he been slaughtered at home, there would have been an abundance of loose fat. We were much gratified to see some large orders, both from Belvoir Castle and Park Farm. Mr. Ford is one of our princely butchers of 40 years' standing, fully deserving of noble customers of this rank. Long may they and he have dealings together. We were equally gratified to be shown a fine portrait of the ox, which will doubtless often call to remembrance one of the finest short-horns ever slaughtered in the British capital. A portrait of the animal will appear in the *Farmer's Magazine*, with pedigree.

Having dwelt thus long on the gold-medal ox, our space, we are afraid, will not permit us to do anything like justice to the merits of the extraordinary display of Devon and Scotch beef and improved Hampshire Down, Scotch, and Welsh mutton which Mr. Jeffery, of Foupert's Place, Regent-street, exhibits to the *élite* of this the most fashionable mart of the metropolis. Mr. Jeffery has this year carried off the butcher's silver medal, and under meritorious circumstances unprecedented in the annals of the Smithfield Club; his purchases being entirely composed of the finest quality of Devons and improved Hampshire Downs exhibited in Baker-street. These who know anything of Regent-street about the opening of Parliament must be familiar with the extraordinary concourse of carriages in the streets, of fashionable pedestrians on the pavement, and windows displaying a profusion of commercial wealth nowhere else to be met with; while in Foupert's-place, we find, on the present occasion, loyal subjects of every grade so thickly grouped together, as to suggest the idea of walking on their heads from one end to the other, admiring the scores of plump, round, unfleeced Southdowns, and thick well-furnished hind-quarters of Devon beef which here hang in full keeping with the general scene. In this, Mr. Jeffery certainly deserves great praise for keeping up the commerce of butcher-meat to that high level which it ought to occupy in this fashionable neighbourhood. His stock is unequalled as to magnitude in the capital, and in quality exemplifying judgment in the selection far above mediocrity; while the routine of his shop bears ample evidence to the highest degree of professional skill, before which carcase disappear like the dew of a summer's morning.

We have here exhibited the carcase of the first prize Devon steer, shown by his Royal Highness Prince Albert in the Bazaar, hanging entire at one side of his shop-door, and on the opposite side, in the same manner, the entire carcase of the first prize heifer, exhibited by the Earl of Leicester, and at another door the four quarters of his Lordship's first prize old Devon ox, forming thus the three first prize animals of the three first classes of Devons.

Prince Albert's ox turns out exceedingly well, showing a large proportion of lean and no extra fat, while both are of the best quality, and finely mixed. The carcase of this little animal illustrates in a very favourable manner the invaluable character of its breed, and the peculiar claims it has upon the farmer, as well as the butcher. There is, perhaps, no breed which turns its food to better advantage under the generality of circumstances than the Improved Devon, and the carcase before us proves that the food consumed in this case has been manufactured into the best quality of meat. No matter, almost, what you give a healthy ox to eat, he will convert it into fine quality. It is the unhealthy animal, with deranged stomach, and absorbents out of order, that makes bad beef, and which could not make fine quality, so long as the system was in this state, give him what food you may. Food has much less to do with the quality of butcher-meat than the public generally imagine.

The Earl of Leicester's ox is also of the finest quality, rather too fat for the generality of tastes; but the quantity of lean is nevertheless large, and finely grained, the marbling of the meat on the rib exceeding in richness almost any we ever saw. It is also of great thickness, while the bone is even smaller and finer in quality than we anticipated it would turn out. As a whole, the carcase is very superior meat, the finely mixing of fat and lean compensating for the excess of the former.

The Earl of Leicester's heifer stands between the last-mentioned two as to fatness. In the fore-quarters she does not much exceed Prince Albert's ox; but the hind-quarters have more outside fat, for on the fore-rib, loins, and rump a little could be spared. Upon the whole, however, the carcase is first-rate quality, with a fair proportion of finely-grained lean meat to be that of a heifer.

Besides the above Devons, Mr. Jeffery has (No. 5) Mr. Futcher's ox, which turns out a fine carcase of excellent beef; and also the Earl of Leicester's highly commended Devon ox.

Of sheep from the bazaar, he exhibits the carcases of Mr. Whittingstall's pen of Improved Hampshire Downs (rather too fat), and Mr. Futcher's improved Hampshire Downs of the same class, but far superior in quality, the carcases having much more lean in proportion to the fat. The quality of this mutton merits special notice.

Of Hereford prize-beef, the metropolis cannot boast this year. Nevertheless, Mr. Maydwell's two fine oxen, slaughtered by Mr. Bannister, purveyor to her Majesty, City, fully maintain the high character of the breed for superior meat. In the same splendid shop—probably the first in the capital—we also observed some excellent Down mutton from the Bazaar, demanding special notice.

The prize Welsh ox (No. 104) of B. E. Bennett, Esq., of Marston, Trussell Hall, turns out better than appearances indicated—fully justifying the Club for appropriating prizes to this breed. Had the show been one of dead-meat, and the cooks and housekeepers of the metropolis the judges, they would doubtless have unanimously awarded the gold medal to the "Principality:" Mr. Johnson, butcher, Commercial-place, Bermondsey, the purchaser, has also Mr. Worthington's Welsh ox (No. 106), which yields very superior meat—finely grained and not over-fat—and has, upon the whole, great credit by his Welsh beef.

The Marquis of Exeter's gold-medal, long-woolled sheep, bought by Mr. Barclay, butcher, 74½, Wells-street, Oxford-street, maintain their character, the quality being very fine. The difficulty of getting a sufficiency of lean for the extra quantity of fat peculiar to this breed is, no doubt, experienced; but the lean itself is finely grained, though defective in quantity. Mr. Barclay has also the second prize pen of the most noble Marquis, which also corroborates the live-stock report, the mutton being superior to that of the gold-medal pen, the quality of the lean being equally fine, but greater in quantity.

Mr. King, Paddington, exhibits the ten carcases of the Duke of Richmond's celebrated southdowns, including his gold-medal pen, highly-commended light-weights of same age, first-prize old sheep, and single pen extra stock, all fine quality, with rather less superfluous fat than usual, and more lean meat.

Mr. Haydon, butcher, Tulse-hill, Brixton, has one of his Grace's Southdowns, a fellow of the above, fully equal, if not superior, in quality to any of them. Indeed, from quality of meat, we feel disposed to award it the gold medal.

Mr. Williams' gold-medal pigs turn out about the finest meat we ever examined, the fat being as clear and pinky in colour as could be wished, and equally firm. It measures (the fat,) four inches, and lean from one to two; the bone being small and fine. Mr. Reth, 22, Stratton Ground, Westminster, the purchaser, deserves great credit for the excellent manner in which they are dressed. He complains a little that he could not prevent them from "wasting," but from the fine health and constitution of the pigs almost no injury to the quality has been sustained. We may just mention that objections have been made to their ages, and that two of the heads have been sent to Professor Simonds; but up to the time we sent in our MS. have not heard results, but as soon as they are known they will be given.

THE FARMER'S CHRISTMAS.

When the novelist essays to realise our Christmas holiday, he is almost certain to make his picture the scene of a country home. It is so, in truth, with nearly all of us. We associate the hearty hospitality of the season, and genial interchange of kindly acts and sympathies, more especially with rural life and customs. The townsman regards, with a passing envy and disappointment, the well-loaded cabs and carriages he sees hastening to the different stations; his fancy follows them easily enough to their journey's end, and colours as readily the cheery welcome and enlivening change of scene which is to make theirs indeed "A Merry Christmas."

Let us follow, too. It is seldom, either, that we might do so with more confidence or satisfaction. It is not to every one living "remote from cities" that Christmas has brought comfort and plenty. It is not always that we might have found a people contented with their fortune, or able to share, as they should at such a time, the bounties with which they had been blessed. The country life of England, however, will bear a better reading now. It is long, in fact, since all classes here could have been more honestly congratulated. Whatever ills or hardships some of our people have had to endure, the position of the country gentleman, the pursuit of the agriculturist, or the condition of the labourer has been one of gradual improvement, and yet prospective encouragement. Shall we say either that they have not merited this change to better times? In congratulating them, rather may we not do so with real pleasure on their success? No one who brings himself to review the vicissitudes of the last few years, the trials agriculture has had to encounter, the uncertainties it has lived through, and the ills it has overcome, but must allow that it has fairly earned its reward. Through depression of all kinds has the art continued systematically to advance; while never was there more done for it than during this very age of trouble and suspense.

If the farmer, then, deserved such a recompence, we trust he may not be found unworthy now that he has attained it. With almost everything he produces commanding a fair price—his corn, his cattle, or his wool almost equally profitable—has he, like many other mortal men, been able least of all to withstand success? We know too well his registered character at such a period. How he is ever grasping for something better yet; how little capable he is of appreciating the present good before him, and how perversely he will overstay his market. His conduct is easily construed into a curse to the community. He forces high prices, by which eventually he cannot benefit, and holds, like a miser, the riches that, till distributed, do good to none.

Let us see if we cannot put him in a more favourable light. With a bountiful harvest, certainly, but little previous store to fall back upon, he can command prices that many circumstances would tend to promise will only be yet better. And has he thus played the niggard over the plenty committed to his charge? Has he just doled out sufficient to keep bread as high as possible, reserving his stronghold for some better opportunity still?—We are happy to say he has done no such injustice to either himself or to others. Whatever may keep up a price, that many profess not to understand, the farmer himself has little to answer for; He has sent forth liberally and wisely from that he has gathered. Never, indeed, was the maxim, that a good man of business is the man who knows when to sell at a fair profit, more thoroughly observed. Take the yield of this season, and the average amount in accordance with the produce annually thrashed out by Christmas, and long is it, we believe, since the supply has been so great. We have the authority of one of the first farmers in the kingdom for saying, that in his own county he never remembered so much corn sent to market so soon after harvest as he had even some weeks since.

We can honestly congratulate the farmer here again. What we are advising, or, better still, recording in England, the press in France is equally urgent in enforcing. In another part of our paper of this day will be found an extract from a late number of the *Constitutionnel*, which concludes with this very excellent caution:—"In the midst of the critical circumstances in which the country is placed, duty and interest alike counsel the producer not to aggravate by exorbitant pretensions, which are certain to be disappointed, a situation rendered already so difficult by the dearness of food. Let the farmers, therefore, in place of waiting for higher prices sell their products at the present rate of quotation, for in doing so they will find it doubly to their advantage, for just as much as all other citizens they have need of tranquillity to prosper." We would counsel our own friend particularly to continue such a course of conduct as that on which he has lately acted. It has all the best principles of business to recommend it, while his observance of it will go far to remove one more libel on his fair fame—that he does not know when he has a good offer. Let him not invite the producers of other countries to force any such lesson upon him. His duty to himself, his family, and, we may add, his country, all go to assure him that he should not be too great a speculator. We must repeat, even beyond this, that as a matter of business, come what may, he could not have done better than he has.

Let us centre our country Christmas here. Let us picture the head of the family as one who has struggled bravely through his difficulties, and ably done his duty in that state of life in which he has been placed. Let us picture him with an easy conscience and prospering household still prepared to do the best with that talent committed to his care. Need we name, as we wish him many as happy a Christmas, those other duties that above all such a season should impress upon us? To the poor round his home, for the brave far from theirs, let him still have some thought as the head of the family. Let them

> "Claim kindred here, and have their claim allowed."

THE HARVEST IN FRANCE.

The *Constitutionnel* contains a long article on the results of the last harvest in different countries, and on the recent measure adopted by the French Government for the prohibition of the exportation of corn. After entering into a variety of details, too long for extract, it says—

"The result is, that the wants of the different States below mentioned may be estimated at 10,450,000 hectolitres. These figures are thus divided:—England, 5,800,000; Belgium, 750,000; Holland, 1,200,000; Switzerland, 1,000,000; Tuscany, 700,000; and the Sardinian States, 1,000,000; in all, 10,450,000. Thus, according to our evaluation, the deficit in Europe this year must be 10 millions of hectolitres, whereas last year it was 40 millions. France and England alone imported nearly 29 millions. The share of Italy, Switzerland, Belgium, and Holland must have been 11 millions, which cercertainly is not an exaggerated amount. In comparing the two years of 1853 and 1854, it is clear that the situation of Europe is better this year, even without her having at her disposal the granaries of the Black Sea. The United States alone would be sufficiently rich to suffice for every want, if there did not remain the Baltic, Spain, Egypt, and the Danubian provinces, offering nearly as great an amount of resources. These considerations fully justify the decree of November 30. The high prices in the markets around us imposed it as a law on the Government to suspend the exportation of corn; for without that measure our wheat would have been sent abroad, and we should have been left without resources to satisfy the demands of consumption. Thanks to the protecting measures of the Government, France, so cruelly tried last year, will not this year have to struggle against the horrors of scarcity. The harvest of corn leaves over and above the wants a considerable reserve. If it be admitted with us that this reserve makes up for the deficit left by maize, buckwheat, and potatoes, it may be said that prices have reached their highest point. Already even they are beginning to decrease, for since November an average decline of 1 f. 50 c. the hectolitre may be perceived. It is towards the north and centre that the fall has been the most marked. In the east, where Switzerland had made some purchases, the decline does not exceed 50 c. According to the official statistics, the hectolitre of wheat costs on an average 15 f. 85 c. in production. But on each side of that price, there is, on the one hand, the Var, where the hectolitre costs 23 f. 50 c., and on the other the Moselle, where it costs only 11 f. But in comparing the average of the cost with that of the sale, which is at present 26 f. 93 c., it is evident that the prices are sufficient to remunerate the agriculturist. In the midst of the critical circumstances in which the country is placed, duty and interest alike counsel the producer not to aggravate by exorbitant pretensions, which are certain to be disappointed, a situation rendered already so difficult by the dearness of food. Let the farmers, therefore, in place of waiting for higher prices, sell their products at the present rate of quotation, for in doing so they will find it doubly to their advantage, for just as much as all other citizens they have need of tranquillity to prosper."

THE OVER-FEEDING QUESTION.

Now, it is in regard to the forcing system in the over-feeding of rams that we believe a change is taking place, in which the real interests of the purchasers of these animals suffer. The fact has been very obvious, this year especially, that at *the shows of rams the principal lots exhibited have far surpassed in fatness the wethers shown.* For instance, at Glasgow, the other day, none of the yearling Leicesters there could at all compare, either in size or fatness, with the rams at the Berwick show. There were many gimmers there exhibited as fit for breeding—much fatter also. Is this as it should be? Do the breeders of the present day consider that their ewes and rams should exceed in fatness the stock which they send to the butcher? In the last century, we find accounts of wethers carrying so much fat that when cut straight through there were from 4 to 7 inches on the ribs. Fashions are now changed, and such sheep, when shearlings, are those that fetch the highest price for breeding. The public are prepossessed in their favour, and of course it is the interest of the breeder, by pampering, with every sort of rich food, their ram lambs, to bring them to the largest size and fattest state possible. Many of them weigh, when one year and four months old, upwards of 20 stones of 14 lbs., live weight. Although it is quite true that some of these animals are very unfit for breeding, still the fashion and a natural desire to purchase the best-looking animal one can obtain, find them buyers. This, no doubt, is sometimes overdone, *and we have repeatedly seen rams which have taken the first prize at shows sold immediately thereafter at butcher's price, or a trifle more*—Highland Society's district prize ones included.

It seems to us that the practice of over-feeding animals intended for breeding is erroneous in principle and hurtful in practice. It is only in a few instances when rams so highly fed can be kept in the same manner by their purchasers. They soon fall off in condition, and after being put to the ewes, become very unserviceable. Besides, *the premature development which all their parts have been subjected to lessens the period of usefulness, and the number which die early is far greater than among those not so pampered.* For those which are intended for hilly and exposed grounds, it is decidedly prejudicial; the great load of fat they carry unfits them for travel, and the transition from the warmth, shelter, and rich food of the nursery to the bare hill sides, is often too much for their constitution to stand. There is another fact now in the feeding of rams that ought to be taken into account, viz., the greater ease with which slower and backward feeders can be forced on. Formerly it was a symptom that the animal was naturally predisposed to lay on fat when it was found to be in good condition. Now, however, it does not necessarily follow, and many descriptions of rams are disposed of with all their points fairly filled out, and their forms fully developed, from the long-continued use of rich food.—*North British Agriculturist.*

THE SMITHFIELD CLUB CATTLE SHOW, 1854.

The object of the Smithfield Club Cattle Show has come at length to be fairly appreciated, as its purpose is year by year more fully attained. It is satisfactory to no longer hear of that ridicule and derision which were once commonly attached to its proceedings. It is more than satisfactory to feel there is proportionately less real cause for any unfavourable expression of this kind. The abuses or mistakes of the society and its supporters have gradually died away, while the national benefit arising from its influence becomes but the more and more apparent. The good stock which were not long since the exception, are now the rule. The prize animal that once stood out so superior to all his fellows, finds few at present in the same class but are well worthy to compete with him. Many of those who laughed at the early efforts of such societies as these will have to thank their promoters for the ample realization of all they promised. The people are daily becoming more systematically supplied with the best food.

This was the striking feature in the show of the past month. It was generally *very good*. Fashion of favour, as is natural enough, selected one or two varieties of animal as superior to all others, though without anything like direct disapproval of those they selected from. If the Shorthorns were excellent, the show of Devons said almost as much for that beautiful breed of cattle. The Herefords could not fairly be recorded as having gone back, if they have not, perhaps, advanced as certainly as the two other kinds we have just referred to. The weak point of the exhibition was with the new classes for Welsh cattle, which so far did but little to merit the compliment paid them. The fault here is of course not with the Club. Its influence may in time tell even on the Principality, particularly as the Committee are about to increase the amount of the prizes, and the number of classes.

With two very competent correspondents, whose labours during the show were severally directed to the cattle and implement divisions of the yard, we shall not here entrench much upon their departments. It is only fair to say that both must have got through their duties with far more comfort and convenience than heretofore. The bazaar has been most successfully extended and improved. Above and below, by some happy contrivance, the one great want so long sought for has at length been found—there is more room for everybody; and from what we saw and heard, there is ample room for everybody. The avenues in the implement gallery—those most difficult of all passages—have been considerably widened, and the visitor has now a chance and thought for something more than merely pushing his way through. The additional space below has been equally well applied, and we can only repeat what almost everyone was ready to admit, that the Smithfield Club has no longer any cause to be dissatisfied with its quarters.

Denied of a necessity the opportunity for trial, one rarely expects to find any great novelty amongst the implements exhibited. We may so leave our correspondent to enumerate the strength of each maker's stand. The display and business here is strictly in conformity with the original purpose of the building as a bazaar. Descending, we come more to its temporary character as a show-yard. The great sight ere was once more "the Durham ox." As our readers will remember, we have hinted how likely the gold medal was to be bespoke by some beast already exhibited at a local meeting. Singularly enough, too, we were able to go even beyond this, and name the very beast it was bespoke with. Of course our only reason for this was the celebrity the Rutland Association has long enjoyed for its show of stock. It never, however, stood so high as at present. The Duke of Rutland's ox was almost generally pronounced to be the best beast ever entered at the Smithfield Show; he was, in fact, so perfect in form, and so evenly fed, as scarcely to look like a fat animal—at any rate, a very different sort of fat animal to what has been shown, and even distinguished here. It was a common cause of regret that he had not been kept for breeding purposes, as he would, no doubt have made an excellent cross for some of other strains, coming as he does from so good a sort on one side, as that of Sir Charles Knightley.

The Gold Medal cow, also a shorthorn, is even better bred; though, strange to say, she was but little admired, when put in comparison with the first prize ox. She is the property of Mr. Towneley, and, we fear, but too probable an example of what this gentleman's stock is likely to come to. Now six years old, she was only barely qualified for a class of cows "that must have had at least one calf." She has had one calf which, it is commonly reported, was never reared—the extraordinary cause of this non-productiveness being that she has been prepared for *breeding* shows! She has been systematically fattened almost from the first, and came into the yard one of the few over-fed beasts to be seen there. The readers of the *Mark Lane Express* know how long we have denounced this monstrous abuse; and yet, so far, how ineffectually! We confess our great hope now is with the Midland Counties Summer Show, where we believe an example will be afforded us of breeding stock being shown in a condition fit to breed from.

We must leave the reports of many other meetings in a very busy week to speak more or less for themselves. At any rate we must take some other occasion of more deliberately referring to them. The dinner of the Smithfield Club, on Wednesday, was very well attended, and really a little more lively than usual—thanks to the exertions of his Grace the Duke of Richmond, who laboured with a very happy effect to keep the business "going." It transpired, in the course of the evening, that some of the members of the Club had started a subscription for the purpose of presenting their honorary Secretary, Mr. Brandreth Gibbs, with a testimonial. No man, we really believe, has more fairly earned such a mark of approval; at the same time, it does strike us that his labours as Director of the Royal Agricultural Society's meetings might be included, and the members of both associations be invited to join in their tribute to one who has done so much for them. This is the testimonial age, and this is of course not the only one now on foot. The Birmingham or Midland Counties Society is about to pay a similar compliment to Mr. Wright, a gentleman who occupies a position very like to that of Mr. Gibbs, and who has worked as energetically and successfully for the meetings under his direction. We can only divide our good word between them.

On the same evening as the Smithfield dinner, Mr. Mechi delivered himself of his balance-sheet at the Society of Arts. We hope hereafter to give some analysis of his address. As is but too customary amongst the many speakers who followed him, the absence of the really practical farmer was still remarkable. On the previous evening, however, Mr. Mechi had come more directly in contact with some, at the monthly discussion meeting of the Farmers' Club, when Mr. Bailey Denton read one of the most valuable papers on drainage that has ever yet been written. The discussion, indeed, was altogether a very good and useful one, marred only by a little personality, which, to say the least of it, was out of place and taste. The dinner of the same Society on the Thursday had no such drawback. It was distinguished rather by some good speeches, and very ably conducted by Mr. Owen Wallis—well characterised by my Lord Berners as one peculiarly eligible for the presidency of such a meeting, as "a good farmer, and a good man."

LIST OF THE AWARDS.

JUDGES.

CATTLE AND LONG-WOOLLED SHEEP: James Quartly, William Bennett, and William Torr.

CROSS-BRED AND SHORT-WOOLLED SHEEP AND PIGS: Henry Fookes, Philip Pester, and Richard Woodman.

DEVONS.

Class 1.—Steers.

1st prize of 25*l*., his Royal Highness Prince Albert.

Silver medal to the breeder, Mr. Richard Mogridge, of Molland, South Molton.

2nd prize of 10*l*., Mr. Walter Farthing, the representative of the late Samuel Farthing, of Stowey-court, Bridgewater.

Class 2.—Steers or Oxen.

1st prize of 25*l*., the Earl of Leicester, of Holkham Hall, Leicestershire.

Silver medal to the breeder, the Earl of Leicester.

2nd prize of 10*l*., Mr. Frederick King, of Nursling, near Southampton.

Class 3—Heifers.

1st prize of 15*l*., the Earl of Leicester.

Silver medal to the breeder, the Earl of Leicester.

2nd prize of 5*l*., his Royal Highness Prince Albert.

Class 4—Cows.

1st prize of 20*l*., Mr. John Hudson, of Castle Acre, Swaffham, Norfolk.

Silver medal to the breeder, Mr. John Hudson.

2nd prize of 10*l*., Mr. Thomas Bond, of Park, North Petherton, Bridgwater.

HEREFORDS.

Class 5.—Steers.

1st prize of 25*l*., Mr. Isaac Niblett, of Conygre House, Filton, Bristol.

Silver medal to the breeder, Mr. T. L. Meire, of Cound, Arbor, Shrewsbury.

2nd prize of 10*l*., his Royal Highness Prince Albert.

Class 6.—Steers or Oxen.

1st prize of 25*l*., Mr. William Heath, of Ludham Hall, Norwich.

Silver medal to the breeder, Mr. Thomas Carter, of Dodmore, near Ludlow.

2nd prize of 10*l*., Mr. Johhn Ford, Jun., of Rushton, near Blandford.

Class 7.—Heifers.

1st prize of 15*l*., Mr. Frederick King, of Nursling, near Southampton.

Silver medal to the breeder, Mr. Thomas Samson, of Kingston Russell, near Dorchester.

2nd prize of 5*l*. withheld.

Class 8.—Cows.

1st prize of 20*l*., Mr. William Heath, of Ludham Hall, near Norwich.

Silver medal to the breeder, Mr. Edward Longmore, of Ludlow.

2nd prize of 10*l*., Mr. John Stevens, of 69, Holywell-street, Oxford.

SHORT-HORNS.

Class 9.—Steers.

1st prize of 25*l*., Mr. James Futcher, jun., of Fovant, near Salisbury.

The silver medal to the breeder, Right Hon. Sidney Herbert, M.P., of Wilton, near Salisbury.

2nd prize of 10*l*., Mr. William Aldworth, of Frilford, Abingdon.

Class 10.—Steers or Oxen.

1st prize of 25*l*., his Grace the Duke of Rutland, of Belvoir Castle, Grantham.

The silver medal to the breeder, his Grace the Duke of Rutland.

2nd prize of 10*l*., Rev. J. Holmes, of Brooke Hall, Norwich.

Class 11.—Heifers.

1st prize of 15*l*., Mr. Joseph Phillips, of Ardington, Wantage.

The silver medal to the breeder, Mr. William Fussell, of Laycock, Chippenham.

2nd prize of 5*l*., the Earl Spencer, of Althorpe Park, Northampton.

Class 12.—Cows.

1st prize of 20*l*., Mr. Charles Towneley, of Towneley Park, Burnley.

The silver medal to the breeder, Mr. Alexander Bannerman, of South Cottage, Chorley.

2nd prize of 10*l*., Mr. J. H. Langston, M.P., of Sarsden House, Chipping Norton.

SCOTCH OR IRISH BREEDS.

Class 13.—Steers or Oxen.

The prize of 10*l*., Mr. John Henry Gurney, of Caston Hall, Norwich.

Class 14.—Heifers or Cows.

The prize of 5*l*., Mr. H. Lindsay, of Westdean, Chichester.

WELSH BREEDS.

Class 15.—Steers or Oxen.

The prize of 10*l*., Mr. B. E. Bennett, of Marston Trussell Hall, Market Harboro'.

Class 16.—Heifers or Cows.

The prize of 5*l*., Mr. Richard Worthington, of Saddington, Market Harboro'.

OTHER PURE BREEDS.

Class 17.—Steers or Oxen.

The prize of 10*l*., Mr. R. H. Chapman, of Upton, Nuneaton.

Silver medal to the breeder, Mr. R. H. Chapman.

Class 18.—Heifers or Cows.

The prize of 10*l*., Messrs. Chas. Neame and Sons, of Selling, Feversham.

Silver medal to the breeders, Messrs. Chas. Neame and Sons.

CROSS OR MIXED BREEDS.

Class 19.—Steers.

The prize of 15*l*., the Earl of Radnor, of Coleshill, Berks.

The silver medal to the breeder, the Earl of Radnor.

Class 20.—Steers or Oxen.

The prize of 15*l*., Mr. William Hewer, of Sevenhampton, Highworth, Wilts.

The silver medal to the breeder, Mr. William Hewer.

Class 21.—Heifers.

The prize of 10*l*., Mr. John Tucker, of Abbey Print Works, Stratford, Essex.

The silver medal to the breeder, Mr. John Tucker.

LONG-WOOLLED SHEEP.

Class 22.

1st prize of 20*l*., the Marquis of Exeter, of Burghley Park, Stamford.

The silver medal to the breeder, the Marquis of Exeter.

2nd prize of 10*l*., Mr. G. S. Foljambe, of Osberton Hall, Worksop.

3rd prize of 5*l*., Mr. Thomas Twitchell, of Willington, Bedford.

Class 23.

1st [illegible]e of 20*l*., Mr. G. S. Foljambe, of Osberton Hall, Worksop.

The silver medal to the breeder, Mr. G. S. Foljambe.

2nd prize of 10*l*., the Marquis of Exeter, of Burghley Park, Stamford.

3rd prize of 5*l*., Mr. Richard Newman, of Harrowden, Bedford.

LONG-WOOLLED (NOT BEING LEICESTERS).

Class 24.

The prize of 10*l*., Mr. William Slatter, of Stratton, Cirencester.

The silver medal to the breeder, Mr. William Slatter.

CROSS BRED SHEEP.

Class 25.

1st prize of 10*l*., Mr. Samuel Druce, of Eynsham, near Oxford.

The silver medal to the breeder, Mr. Samuel Druce.

2nd prize of 5*l*., Mr. John Overman, of Burnham Sutton, Burnham Market, Norfolk.

Class 26.

The prize of 10*l*., Mr. John Overman.

The silver medal to the breeder, Mr. John Overman.

SHORT-WOOLLED SHEEP.

Class 27.

1st prize of 20*l*., the Duke of Richmond, of Goodwood, Chichester.

The silver medal to the breeder, the Duke of Richmond.

2nd prize of 10*l*., Lord Walsingham, of Merton Hall, Thetford.

Class 28.

The prize of 10*l*., Mr. William Rigden, of Hove, near Brighton.

The silver medal to the breeder, Mr. William Rigden.

Class 29.

1st prize of 20*l*., the Duke of Richmond, of Goodwood, Chichester.

The silver medal to the breeder, the Duke of Richmond.

2nd prize of 10*l*., Lord Walsingham, of Merton Hall, Thetford.

SHORT-WOOLLED (NOT BEING SOUTH DOWNS)

Class 30.

The prize of 10*l*., Mr. William King, of New Hayward Farm, Hungerford.

The silver medal to the Breeder, Mr. William King.

PIGS.

Class 31.

1st prize of 10*l*., Mr. J. V. Williams, of Haygrove Farm, Bridgewater.

The silver medal to the breeder, Mr. J. V. Williams.

2nd prize of 5*l*., Mr. Wm. M. Barber, of Langley Broom, Slough.

Class 32.

1st prize of 10*l*., Mr. John Coate, of Hammoon, Dorset.

The silver medal to the breeder, Mr. John Coate.

2nd prize of 5*l*., Mr. Samuel Druce, of Eynsham, Oxford.

Class 33.

1st prize of 10*l*., Mr. Samuel Druce, Oxford.

The silver medal to the breeder, Mr. Samuel Druce.

2nd prize of 5*l*., Mr. Stewart Majoribanks, of Bushey Grove, Watford.

GOLD MEDALS.

The gold medal to the best steer or ox in any of the classes, the Duke of Rutland, of Belvoir Castle, Grantham.

The gold medal to the best heifer or cow in any of the classes, Mr. Charles Townley, of Townley Park, Burnley.

The gold medal to the best pen of long-woolled sheep in any of the classes, the Marquis of Exeter, of Burghley Park.

The gold medal for the best pen of short-woolled sheep in the 27th, 28th, or 30th classes, the Duke of Richmond, of Goodwood.

The gold medal to the best pen of pigs in any of the classes, Mr. J. V. Williams, Haygrove Farm, Bridgewater.

EXTRA STOCK.

The silver medal to the best beast in extra stock, Lord Feversham, Duncombe Park, York.

The silver medal to the best long-woolled sheep in extra stock, Mr. William Sanday, Holme Pierrepoint, Nottingham.

The silver medal to the best short-woolled sheep in extra stock, Mr. William Rigden, Hove, Brighton.

The silver medal to the best cross-bred sheep in extra stock, Mr. George Hine, jun., Oakley, Bedford.

The silver medal to the best pig in extra stock, His Royal Highness Prince Albert.

COMMENDATIONS.

HIGHLY COMMENDED.

The Earl of Leicester's Devon steer.
Mr. G. Hine's, jun., pen of cross-bred sheep.
Mr. W. Rigden's pen of South Downs.
The Duke of Richmond's pen of South Downs.
Mr. S. King's pen of Hampshire Downs.
The Earl of Leicester's South Down wether.
Mr. John Coates's pen of Dorset pigs.
Mr. M. Newman's pen of Essex and Berks pigs.
Rev. J. Holmes' pen of pigs.

COMMENDED.

The Earl of Leicester's Devon cow.
The Marquis of Exeter's shorthorned steer.
Mr. Edward Frost's shorthorned steer.
Mr. J. W. Brown's shorthorned steer.
The Marquis of Exeter's shorthorned steer.
Mr. S. Gooch's shorthorned ox.
Rev. J. Arkwright's shorthorned and Ayrshire cow.
Mr. J. Hitchman's cross-bred wethers.
Mr. J. Hitchman's cross-bred wether.
Mr. H. Lugar's pen of South Down wethers.
Sir R. Throckmorton's, Bart., pen of South Down wethers.
The Earl of Radnor's pen of South Down wethers.

COMMENDED GENERALLY.

Young pigs.

TO THE EDITOR.

SIR,—Knowing you wish the report of the Smithfield Club to be correct, and imagining you might have taken it before Thursday P.M., since which there has been an alteration in the prize list, viz., a disqualification on account of a misrepresentation in age—Class 32, No. 262, disqualified; leaving No. 266 to take the first prize, and No. 268 the second—I shall feel obliged by your placing this in your valuable Journal.

Yours respectfully,
M. NEWMAN,
A Member of the Smithfield Club.

Smithfield Club, Baker-street.

CONSECUTIVE ANALYSIS OF THE STOCK EXHIBITED.

We have again the pleasure to offer a report of the annual gathering of the Smithfild Club. It is very gratifying at all times to be able to report satisfactory progress; and of this we have abundant evidence on the present occasion. The improvements made in the show-yard, allowing more space for the exhibition both of stock and implements, the beautiful order of arrangement, the cleanliness and neat fittings to the stalls, the disposition of the various pens, and the easy approach to every animal, make a visit more than usually interesting. The whole arrangement reflects great credit upon the indefatigable Secretary, and his able coadjutors, the Stewards of the Show. We might further say that we have seldom seen such an assemblage of contented faces. The proverbial grumbling said to be inherent in the British farmer is for once, at all events, thrown aside: we meet only with the composed and happy countenance, manifesting deep interest in the exceedingly good and great show before them. It is true that, occasionally, individual specimens of each breed of animals have surpassed those shown at the present meeting; but we think, as a whole, it is above the average, and that each separate breed is fully and admirably represented. We have watched carefully for several years the attempts made to introduce new breeds of cattle and sheep, by crossing in various ways. This year has certainly produced some very good specimens of the kind. Amongst them we would name the Earl of Radnor's steer (No. 113), Mr. Hewer's ox (No. 116), and Mr. Tucker's heifer (No. 121), in the cattle classes, and Mr. Druce's three sheep (No. 172). We mention the latter, as we have had our eye upon them for some time, as knowing it was an attempt at a new character of animal, to be derived from Cotswold and Down cross. At the Gloucester meeting, we reported unfavourably: they then denoted large, coarse heads and offal, with no counterbalance in frame. The specimens shown at this meeting are a very great improvement, and is the result of judicious in-and-in breeding. It is certain that these crosses have produced some extraordinary animals; and it is interesting to ascertain and notice how they favour the sire or the dam. The Shropshire breed, specimens of which were exhibited by the Earl of Aylesford, are very superior animals, and are, we believe, the result of careful crossing from Down and Leicester. We are not aware of other attempts at continuous crossing, but shall be glad to receive any reports thereof, if attended with success worthy of notice. The majority of pens exhibited were simply first crosses, and splendid specimens too, as shown by Mr. John Overman and others.

In the cattle classes, we have not much to remark on this head; indeed, we do not know of any continuous cross, with a view to perpetuate the breed shown at the yard. Those shown were very good specimens of a single cross. We value true breeding very highly; but we are never against aiming at greater perfection, nor do we indulge prejudices likely to retard such advancement.

CATTLE.

We will give a short consecutive account of the classes, in order as by the catalogue, remarking upon such as (in our own judgment) were more particularly deserving of notice.

DEVONS.

CLASS I.—DEVON STEERS, not exceeding 3 years old, without restrictions as to feeding, yet the kind or kinds of food must be certified.

2 His Royal Highness Prince Albert, 2 years and 10 months, bred by Richard Mogridge, of Molland, near South Molton, and fed on bean and barleymeal, linseedcake, mangel wurzel, swedes, and hay.

This is a beautifully proportioned animal, but small; fine offal, and quality of flesh exceedingly good; his thighs rather defective—1st prize.

6 Walter Farthing, as representative of the late Samuel

Farthing, of Stowey Court, near Bridgewater, Somerset, 2 years and 11 months, bred by the late Samuel Farthing, and fed on hay, grass, roots, bean and barleymeal, and oilcake.

A very deeply formed animal, but not proportionate; chine rather defective; body too swelled out and low; hips not wide; capital twist.—2nd prize.

8 The Earl of Leicester, of Holkham Hall, Wells, Norfolk, 2 years 10 months and 2 weeks, bred by his lordship, and fed on turnips, mangel wurzel, hay, linseedcake, and oat, bean and peameal.

A very superior frame; well fatted back throughout, of good quality of flesh; hips rather narrow, and twist thin.—Highly commended.

Class II.—Devon Steers or Oxen, above 3 years old, without restrictions as to feeding, yet the kind or kinds of food must be certified.

19 The Earl of Leicester, of Holkham Hall, Wells, Norfolk, 4 years and 1 week, bred by his lordship, and fed on turnips, mangel wurzel, hay, linseedcake, oatmeal, and bean and peameal.

A beautifully fed animal; fine chest, chine, and breast; quality exceedingly good; hind quarters, as a whole, not very good.—1st prize.

16 Frederick King, of Nursling, near Southampton, 4 years and 11 months, bred by Benjamin Hobbs, of Cannington, near Bridgewater, and fed on mangel wurzel, swedes, oatmeal, oilcake, and hay.

A very deep chest, and well-proportioned frame, with good hips and thighs; the quality of flesh not equal to No. 19.—2nd prize.

Class III.—Devon Heifers, not exceeding 4 years old, without restriction as to feeding, yet the kind or kinds of food to be certified. Free martins or spayed heifers not qualified.

25 The Earl of Leicester, of Holkham Hall, Wells, Norfolk, 3 years and 9 months, bred by his lordship, and fed on turnips, mangel wurzel, hay, linseedcake, oat and peameal.

This is a very finely-formed heifer, perhaps her forequarter somewhat too light in proportion to her other many good qualities.—1st prize.

22 His Royal Highness Prince Albert, 3 years and 8 months, bred by the late Samuel Farthing, of Stowey Court, Bridgewater, and fed on bean and barleymeal, linseedcake, mangel wurzel, swedes, and hay.

A beautiful deep well-formed fore-quarter.—2nd prize.

Class IV.—Devon Cows, above 4 years old. They must have had at least one live calf. Without restriction as to feeding, yet the kind or kinds of food to be certified.

29 John Hudson, of Castle Acre Lodge, near Swaffham, Norfolk, 5 years, bred by exhibiter, and fed on grass, hay, swedes, linseedcake, and beanmeal—had 2 calves.

This animal is of almost perfect symmetry, and flesh of most excellent quality; the only defect is her small size.—1st prize.

27 Thos. Bound, of Park, North Petherton, near Bridgewater Somerset; 5 years and 2 months, bred by exhibiter, and fed on hay, grass, roots, barleymeal and flaxseed—had 2 calves.

A beautiful well-formed forequarter, her tail and across from hip to hip rather high.—2nd prize.

30 William Cary Coles, of Yew Tree Close Farm, Yeovil, Somerset, 7 years and 11 months, bred by exhibiter, from the stocks of Mrs. Phillis Coles and Mr. Brook, and fed on crushed oats, swedes, mangel wurzel, cracked old beans, and roots—had 4 calves.

This is a good heavy cow and well formed.

HEREFORDS.

Class V.—Hereford Steers, not exceeding 3 years old, without restrictions as to feeding, yet the kind or kinds of food to be certified.

38 Isaac Niblett, of Conygre House, Filton, near Bristol, 2 years and 11 months, bred by T. L. Meire, of Cound, near Shrewsbury, and fed on hay, swedes, mangel wurzel, oat and barley meal, and oilcake.

A beautifully formed animal, well proportioned, with straight level back, and quality of flesh very superior—1st prize.

3 His Royal Highness Prince Albert, 2 years 11 months, bred by John Burlton, of Luntley Court, near Leominster, from the stock of Mr. Yeld, and fed on bean and barley meal, linseedcake, swedes, and hay.

A very deep framed well-formed animal, capital flank, and with much lean flesh of good quality.—2nd prize.

Class VI.—Hereford Steers or Oxen, above 3 years old, without restrictions as to feeding, yet the kind or kinds of food must be certified.

2 William Heath, of Ludham Hall near Norwich, 3 years 11 months and 17 days, bred by Thomas Carter, of Dodmore, near Ludlow, and fed on grass, hay, turnips, oilcake, oat and pea meal.

A splendid animal, very deep in frame, and thick in flesh, of excellent quality; a very remarkable chine, and chest of surprising girth, flanks deep and full; a little spot in the back is defective; altogether a first-rate ox, and nearly equal to any of former years.—1st prize.

49 Jno. Ford, Jun., of Rushton, near Blandford, Dorset, 3 years and 11 months, bred by Peregrine Prince, of Dewsal Court, near Hereford, from the stock of D. Pearce, of Stretton, and fed on hay, straw, linseed cake, and roots.

This is a very large and unusually heavy animal, of very deep frame, but not so symmetrical as No. 42, nor fed so evenly; his girth is very great, and of good height and proportionate.—2nd prize.

Class VII.—Hereford Heifers, not exceeding 4 years old, without restrictions as to feeding, yet the kind or kinds of food must be certified. Free-martins and spayed heifers are not qualified.

51 Frederick King, of Nursling, near Southampton, 3 years and 10 months, bred by Thomas Samson, of Kingston Russell, near Dorchester, and fed on mangel wurzel, swedes, oatmeal, oilcake, and hay.

A well-fed useful cow.—1st prize.

2nd prize withheld.

Class VIII.—Hereford Cows, above 4 years old, without restrictions as to feeding, yet the kind or kinds of food must be certified. Free-martins and spayed heifers are not qualified.

52 William Heath, of Ludham Hall, near Norwich, 7 years and 11 months, bred by Edward Longmore, of Ludlow, from the stock of Mr. Yeld, of the Broom, and fed on grass, hay, turnips, oilcake, and oat and pea meal—had 3 calves.

A large and good cow, deep in frame, and great length; plenty of good lean flesh, but not of best quality.—1st prize.

54 John Stevens, of 69, Holywell-street, Oxford, 5 years and 10 months, bred by Arthur Robert Blake, of Eynsham, Oxon, and fed on hay, grass, cake, meal, and swedes—had 3 calves.

A fair-made animal, with flesh of good quality.

SHORTHORNS.

Class IX.—Shorthorned Steers, not exceeding 3 years old, without restrictions as to feeding, yet the kind or kinds of food must be certified.

60 James Fatcher, jun., of Fovant, near Salisbury, 2 years and 11 months, bred by the Right Hon. Sidney Herbert, M.P., of Wilton, near Salisbury, and fed on oilcake, bean and barley meal, cabbage, swedes, and hay.

A very extraordinary animal for his age, of nearly perfect symmetry; deeply formed in chest and rib, fine huge purse, handsome head and countenance; the only really defective point is his twist.—1st prize.

61 William Aldworth, of Frilford, near Abingdon, Berks, 2 years and 11 months, bred by E. R. Williams, of East Challow, near Wantage, from the stock of Mr. Bowley, of Cirencester, and fed on grass, hay, swedes, barley and bean meal and cake.

This is a very good animal; perhaps not quite equal to No. 60, not quite so symmetrical and even in general frame, but he has a better twist, and nearly as good in his essential points.—2nd prize.

56 Edward Frost, of West Wratting Hall, near Linton, Cambridge, 3 years and 11 months, bred by Jonas Webb, of Babraham, and fed on linseedcake, beanmeal, turnips, and clover.

A deep fore-quarter and capital chine, ribs springing, hips rather too close; quality of meat very good.—Commended.

57 The Marquis of Exeter, of Burghley Park, near Stamford, Lincoln, 2 years and 8 months, bred by exhibiter, and fed on linseedcake, beanmeal, and vegetables.

A better frame; flesh not so good quality.—Commended.

58 John Washbourn Brown, of Uffcott, near Swindon, Wilts, 2 years and 11 months, bred by exhibiter, from the stock of Richard Stratton, of Broad Hinton, and fed on hay, cabbage, beanmeal, and oilcake.

This is a good animal; frame perhaps too long.—Commended.

We have seldom seen a better class, and it deserves especial commendation—nearly every animal is a first-class one.

Class X.—Shorthorned Steers or Oxen, above 3 years old, without restrictions as to feeding, yet the kind or kinds of food must be certified.

The Duke of Rutland, of Belvoir Castle, near Grantham, Lincoln, 4 years and 4 months, bred by exhibiter, and fed on barley, beanmeal, linseedcake and oil, vegetables, and hay.

We scarcely remember seeing a batter framed ox than this. If anything he is not quite noble or grand enough in his general character. There is something, too, common about him, particularly in colour; but a deeper chest and length of rib is seldom seen. His girth is astonishing. His frame, though not truly cylindrical, is in reality of better form—a great carcase, on short legs of fine bone. His depth throughout is extraordinary. His ribs, though not sufficiently springing, are well set on chine and back, and nicely thrown out; their length very great. His meat of very good, if not indeed of first-rate, quality.—1st prize.

67 The Rev. J. Holmes, of Brooke Hall, near Norwich, 3 years and 4 months, bred by exhibitor, and fed on grass, hay, chaff, mangel wurzel, turnips, oilcake, and meal.

A beautiful fore-quarter; fine out-shoulder; great girth; large, full bosom; ribs good, and well springing; broad chine and back; twist and thighs rather light.—2nd prize.

73 The Marquis of Exeter, of Burghley Park, near Stamford, Lincoln, 3 years and 8 months, bred by exhibiter, and fed on linseedcake, beanmeal, and vegetables.

A well-made, symmetrical ox, of large frame; good quality.—Commended.

80 Stephen Gooch, of Honingham, near Norwich, 4 years and 6 months, bred by Frederick Fossitt, of Strugg's Hill, Setterton, near Spalding, and fed on grass, turnips, mangel wurzel, bean and barley meal, and linseedcake.

A good ox; large, fine frame, and well made up.—Commended.

Class XI.—Shorthorned Heifers, not exceeding 4 years old, without restriction as to feeding, yet the kind or kinds of food must be specified. Free-martins or spayed heifers not qualified.

83 Joseph Phillips, of Ardington, near Wantage, Berks, 3 years and 9 months, bred by Wm. Fussell, of Laycock, near Chippenham, and fed on barleymeal, cake, swedes, and hay.

A very fine cylindrical frame, of good proportions; chine broad, and ribs widely springing; hips and teats somewhat elevated, and loins thin.—1st prize.

82 The Earl Spencer, of Althorp Park, near Northampton, 3 years and 10 months, bred by exhibitor, from his own and Sir Charles Knightley's, Bart., stocks, and fed on grass, hay, turnips, mangel wurzel, and beanmeal.

A very fine animal, and well proportioned, but not so deep in general frame as No. 83. Offal not fine enough.

Class XII.—Short-horned Cows, above 4 years old, that must have had at least one live calf, without restrictions as to feeding, yet the kind or kinds of food must be certified.

89 Charles Towneley, of Towneley Park, near Burnley, 6 years and 8 months, bred by Alexander Bannerman, of South Cottage, Chorley, Lancaster, from the stock of Mr. Booth, of Killerby, and fed on grass, turnips, hay, oilcake, and beanmeal—had one calf.

A very surprising cow; her fore-quarters exceedingly good, out shoulder very good, chine amazingly broad, and ribs springing; very wide; her whole back of astonishing width and level; her tail rather high, and teats deformed with fat; otherwise very symmetrical in frame, and evenly fed.—1st prize.

87 J. H. Langston, M.P., of Sarsden House, near Chipping Norton, Oxon, 5 years and 7 months, bred by exhibiter, and fed on hay, oilcake, beanmeal, and turnips—had one calf.

This is a beautiful cow; her out shoulder very good, her frame cylindrical in shape, and her form as good; but not equal in general substance to No. 89; in appearance, handsomer; her thighs and twist rather thin in proportion.—2nd prize.

88 Mr. Linton's, of Sheriff Hulton, Yorkshire,

Is a very large beautifully-formed cow.

95 Mr. Clarke's, of New Moor, near Southminster, Essex,

Is a very large high-standing well-formed cow; the largest in the yard, and of good quality.

Several others might be enumerated; but it is almost invidious to make selections in these classes, other than made by the judges in discharge of their duty. We think the classes of short-horns quite bear the palm at this meeting, and as a whole fully equal, if not surpass, the average of past years.

SCOTCH OR IRISH.

Class XIII.—Scotch or Irish Steers or Oxen, of any age, without restrictions as to feeding, yet the kind or kinds of food must be certified.

99 John Henry Gurney, of Catton Hall, near Norwich, Galloway Scot, from 4 to 5 years, breeder unknown, and fed on swedes, beet, cut hay, pea and barley meal, and linseedcake.

A heavy framed well-fed Galloway Scot, on short legs; his frame is long, but thick.—Prize.

Class XIV.—Scotch or Irish Heifers or Cows, of any age, without restrictions as to feeding, yet the kind or kinds of food must be certified.

103 Hugh Hamilton Lindsay, of Westdean, near Chichester, Sussex, Galloway, breeder unknown, about 4 years, and fed on oilcake, damaged wheat, peas, beans, linseed, carrots, turnips, clover, vetches, grass, and hay.

A useful heifer; rather small.

WELSH.

Class XV.—Welsh Steers and Oxen (Runts) of any age, without any restrictions as to feeding; yet the kind, or kinds, of food must be certified.

101 B. E. Bennet, of Manton Trussell Hall, near Market Harborough. Welsh breeder unknown; supposed about 4 years, and fed on grass, hay, linseedcake, and bean-meal.

First prize.

Class XVI.—Welsh Heifers and Cows of any age, without restrictions as to feeding; yet the kind, or kinds, of food must be certified.

108 Richard Worthington, of Soddington, near Market Harborough, Leicester, Welsh, 4 years and 3 months, bred by Owen Williams, of Plas L'anfihengel, Anglesea, and fed on linseedcake and bean-meal.

A good Welsh cow. Prize.

OTHER PURE BREEDS.

Class XVII.—Steers or Oxen, of any pure breed (except Devons, Herefords, Shorthorns, and Scotch, Welsh, or Irish), of any age, without restrictions as to feeding; yet the kind, or kinds, of food must be certified.

110 R. H. Chapman, of Upton, near Nuneaton, Warwick, 4 years and 8½ months pure longhorn, bred by exhibiter, and fed on grass, hay, turnips, cake, and bean-meal.

A long-framed good animal; large, level, fairly proportioned.—Prize.

Class XVIII.—Heifers or Cows, of any pure breed (except Devons, Herefords, Shorthorns, and Scotch, Welsh, or Irish), of any age, without restrictions as to feeding; yet the kind, or kinds, of food must be certified.

112 Charles Neame and Sons, of Selling, near Faversham, Kent, 3 years and 11 months Sussex, bred by the exhibiters, and fed on linseedcake, clover hay, green clover, and turnips.

A very good and beautifully-formed cow, of excellent quality of flesh.

CROSS OR MIXED BREEDS.

Class XIX.—Cross or Mixed-bred Steers, not exceeding 3 years, without restrictions as to feeding; yet the kind, or kinds, of food must be certified.

113 The Earl of Radnor, of Coleshill House, near Highworth, 2 years and 5 months shorthorn and Hereford, bred by exhibiter, and fed on hay, corn, cake, and roots.

Prize.

Class XX.—Cross or Mixed bred Steers or Oxen above 3 years old, without restrictions as to feeding; yet the kinds, or kinds, of food to be certified.

116 William Hewer, of Sevenhampton, near Highworth, 4 years and 8 months shorthorn and Hereford, bred by exhibiter, and fed on swedes, bean-meal, and oilcake.

A long, finely-grown animal, of great substance, but not symmetrically proportioned.—Prize.

Class XXI.—Cross or Mixed-bred Heifers not exceeding 4 years old, without restriction as to feeding; yet the kind, or kinds, of food must be certified.

121 John Tucker, of Abbey Print Works, near Stratford, Essex, 3 years and 8 months Hereford and shorthorn, bred by exhibiter, from the stocks of James Williams and Thomas Bates, and fed on hay, oilcake, bean and barley meal, swedes, and carrots.

A very good cow; large and well formed, with good quality of flesh.—Prize.

EXTRA STOCK.

Cattle.

129 Rev. Joseph Arkwright, of Mark Hall, near Harlow, Essex, 8 years and 9 months shorthorned and Ayrshire cow, bred by exhibiter, and fed on grass, linseedcake, hay, roots, barley and bean meal. Had 5 calves.

A handsome, well-formed animal; of excellent quality, and evenly fed.—Commended.

128 Lord Feversham, of Duncombe Park, near Helmsley, York, 5 years 4 months shorthorned heifer, bred by the late Mr. Bates, of Kirklevington, near Yarm, and fed on hay, turnips, meal, and cake.

This is a beautiful specimen of the late Mr. Bates' breed, and ought not to pass unnoticed; we therefore make honourable mention of her. Her hand first-rate.

We have extended our report of the cattle classes, meagre as it is, further than we originally intended; but we could not satisfy ourselves with a less cursory notice of so many valuable animals.

Having devoted considerable space to that most important department of the club show—the cattle classes, we must be more brief in other respects. The sheep classes, as a whole, were well represented the Down and half-bred classes particularly so; but we should like to have seen a better and more numerous class of long-wools of both kinds, *i. e.*, *Leicesters*, and *long-wools not being Leicesters.* Some good animals were shewn, but, we think, not equal to former years. In the Leicester class we do not think they equalled those of the palmy days of Messrs. Pawlett and Painter either in beauty, substance, or quality of meat. In the *long-woolled class* we have seen much better sheep exhibited, and the number shown was extremely small. The extra stock class contained several very good specimens of these breeds, but nothing worthy of more especial notice. In the cross-breed classes many very splendid sheep were shown; proving satisfactorily the desirability of continuous attempts to introduce improved breeds. In the Down classes we think great progress is yet making: our taste accords most with the production of a great weight of food of good quality in a given time, either in growth or feeding. We think the Hampshire Downs shown gave decided advantages on this point, being very large, and heavy. The pure Downs also gave evidence of improvement. We never saw the Duke of Richmond's Downs show so well; they retain their symmetry under a broader frame of greater substance. We will now run hastily through the classes, referring to the prize list, as before.

LONG-WOOLLED BREEDS.

Class XXII.—Fat Wether Sheep, of any Long-woolled breed, 1 year old (under 22 months), without restrictions as to feeding.

136 The Marquis of Exeter, of Burghley Park, near Stamford, a pen of three 21 months Pure Leicester Wethers, bred by exhibiter.

This is a pen of beautifully-formed sheep, and greatly alike: hand rather loose, good wool, broad staple, and curly, looks good with fine plaits; rumps short, loin and back well covered.—1st prize.

139 G. S. Foljambe, of Osberton Hall, near Worksop, Notts, a pen of three 20 months Leicester Wethers, bred by exhibiter, from the stock of Mr. Sanday.

A very good lot, and in several points superior to No. 136; full heavy necks, good rumps, fine offal, good firm hand; wool very heavy, large staple, and good; very compact in frame.—2nd prize.

137 Thomas Twitchell, of Willington, near Bedford, a pen of three 20 months Leicester Wethers, bred by exhibiter.

These are three pretty animals, with very firm hand; chines not broad enough; wool small, staple straight and thin.—3rd prize.

CLASS XXIII.—FAT WETHER SHEEP, of any Long-woolled breed, 1 year old (under 22 months), without restrictions as to feeding. Each Sheep not to exceed 220lbs. live weight.

143 G. S. Foljambe, of Osberton Hall, near Worksop, Notts, a pen of three 20 months Leicester Wethers, bred by exhibiter, from the stock of Mr. Sanday.

Three very complete small Leicesters, and well-matched rumps, rather short.—1st prize.

142 The Marquis of Exeter, of Burghley Park, near Stamford, a pen of three 21 months Pure Leicester Wethers, bred by exhibiter.

Three heavier-woolled sheep; mutton better than No. 136.—2nd prize.

144 Richard Newman, of Harrowden, near Bedford, a pen of three 21 months Pure Leicester Wethers, bred by exhibiter, from the stock of Mr. Pawlett.

Well matched; mutton beautiful, quality firm but elastic; wool too straight, thin in staple.

LONG-WOOLLED BREEDS NOT BEING LEICESTERS.

CLASS XXIV.—FAT WETHER SHEEP, of any long-woolled breed (not Leicesters), 1 year old (under 22 months), without restrictions as to feeding.

147 William Slatter, of Stratton, near Cirencester, Gloucestershire, a pen of three 21 months Cotswold wethers, bred by exhibiter.

These are three well-formed good sheep, with better hand than usually found in this class; wool plentiful, with broad staple.

EXTRA STOCK.—LONG-WOOLLED SHEEP.

161 William Sanday, of Holme Pierrepont, near Nottingham, 57 months Leicester ewe, bred by exhibiter.

This ewe has a fine expansive chest, with capital neck and plaits; but defective loin; wool too thin in staple.

152 John Clarke, of Long Sutton, near Lincoln, 56 months improved Lincolnshire ewe, bred by exhibiter.

This is a very good ewe, with beautiful looks; fat back, and abundance of good wool.

154 Henry Neville, of Walcot, near Stanford, Northampton, 81 months Lincoln ewe, bred by exhibiter.

A very pretty deeply-framed ewe.

CROSS BREEDS.

CLASS XXV.—LONG and SHORT-WOOLLED CROSS-BRED FAT WETHER SHEEP, 1 year old (under 22 months), without restrictions as to feeding.

172 Samuel Druce, of Ensham, Oxfordshire, a pen of three 21 months Down and Cotswold wethers, bred by exhibiter.

Three very large and profitable sheep in every respect; broad frames, deep and good; wool good, fine down character, and plentiful. These sheep are bred with a view to establish a new variety in the breeds of sheep. The produce of a Cotswold ram put to a Down flock, and these being bred in and in for fifteen years, have resulted in producing the fine specimens Mr. Druce has this year shown.—1st prize.

170 John Overman, of Burnham Sutton, near Burnham Market, Norfolk, a pen of three 20 months Down and Leicester wethers, bred by exhibiter, from the stock of H. Aylmer, of West Dereham.

Three exceedingly good half-bred sheep, of good quality of mutton, and wool of Down character; backs very broad, and well covered.—2nd prize.

166 George Hine, jun., of Oakley, near Bedford, a pen of three 21 months Sussex-down and Leicester wethers, bred by exhibiter, from the stock of the Duke of Manchester.

Three very large beautiful sheep; broad frames, of good symmetry and looks, with excellent mutton and wool. Down ram and Leicester ewes.—Commended.

No. 168 is a very large pen of sheep—Hampshire Down and Leicester ewes.

No. 173 is a pen of large-framed high-standing sheep, denbting the Down in character. Down ram to Cotswold ewes.

CLASS XXVI.—LONG and SHORT-WOOLLED CROSS-BRED FAT WETHER SHEEP, 1 year old (under 22 months), without restrictions as to feeding. Each sheep not to exceed 220lbs. live weight.

175 John Overman, of Burnham Sutton, near Burnham Market, Norfolk, a pen of three 20 months Down and Leicester wethers, bred by exhibiter, from the stock of Mr. H. Aylmer, of West Dereham.

Three very pretty sheep of good form; rather low standing; good in quality of mutton, and plenty of wool.—Prize.

EXTRA STOCK.

SHORT-WOOLLED SHEEP.

185 George Hine, Jun., of Oakley, near Bedford, 21 months Sussex Down and Leicester Wether, bred by exhibiter, from the stock of the Duke of Manchester.

A very compact sheep, very broad, with capital chine.—Silver medal.

SHORT-WOOLLED BREEDS.

CLASS XXVII.—FAT WETHER SHEEP, of any Short-woolled breed, 1 year old, (under 22 months,) without restrictions as to feeding.

195 The Duke of Richmond, of Goodwood, near Chichester, a pen of three 20 months South-down Wethers, bred by exhibiter.

Three very superior sheep, finely formed broad frames, all but correct in shape and make, beautiful heads and countenances, offal light, and hand excellent; perhaps their backs a little too thin in fat; wool good. We think this pen a decided improvement upon the symmetrical frame ever shown by the noble Duke, being more compact and cylindrical.—1st prize.

201 Lord Walsingham, of Merton Hall, near Thetford, Norfolk, a pen of three 20 months South-down Wethers, bred by exhibiter.

Three very good animals, but like the No. 195, their backs not well covered, rather too much set down in carcase, *i. e.*, rib and hip too far apart, and chines not quite first-rate for this class; wool thin.—2nd prize.

CLASS XXVIII.—FAT WETHER SHEEP, of any Short-woolled breed, 1 year old, (under 22 months,) without restrictions as to feeding. Each Sheep not to exceed 200 lbs. live weight.

210 William Rigden, of Hove, near Brighton, a pen of three 20 months and 2 weeks South-down Wethers, bred by exhibiter.

These are almost perfect specimens of the Southdown breed, the only fault being their comparatively small size.

Class XXIX.—Fat Wether Sheep, of any Short-woolled breed, 2 years old, (above 22 and under 34 months,) without restrictions as to feeding.

222 The Duke of Richmond, of Goodwood, near Chichester, a pen of three 32 months Southdown Wethers, bred by exhibiter.

A pen of very good and large-framed sheep, unusually good thighs, chine, and plaits, form long and broad, level backs, but not well covered. These, like the noble Duke's other pens of sheep, are better formed than he has heretofore shown.—1st prize.

225 Lord Walsingham, of Merton Hall, near Thetford, Norfolk, a pen of three 32 months Southdown Wethers, bred by exhibiter.

Three very compact good animals, plaits very good, chine broad and ribs well thrown out, deep chests but thin, rumps short, and loins thinly covered.—2nd prize.

SPORT-WOOLLED BREEDS, (not being Southdowns.)

Class XXX.—Fat Wether Sheep, of any Short-woolled breed (not Southdowns,) 1 year old, (under 22 months,) without restrictions as to feeding.

233 William King, of New Hayward Farm, near Hungerford, Berks, a pen of three 21 months West Country Down Wethers, bred by exhibiter.

Three very large high-standing broad and long frames.—1st prize. This is a class of extraordinary tall and long, yet broad-framed sheep, many of them disfigured by being shorn into shape. We have frequently complained of this mode of trimming sheep. We noticed some specimens regularly cut into shape; we think in one or two cases they almost deceived the judges. It appears pretty general in all the short-woolled classes.

EXTRA STOCK.

Short-woolled Sheep.

235 William Rigden, of Hove, near Brighton, 44 months Southdown ewe, bred by exhibiter.

A very beautiful specimen of a pure Down sheep, but too small for profitable grazing.

The classes of Southdowns were much admired, and well deserved commendation, but a notice of which, as in some other classes, for want of space we are obliged to omit.

PIGS.

Class XXXI.—Pigs of any Breed, above 13 and not exceeding 26 weeks old.

251 J. V. Williams, of Haygrove Farm, near Bridgewater, Somerset, a pen of three 17 weeks and 2 days Improved Leicester, bred by exhibiter, and fed on whey, barleymeal, and potatoes.

Three most extraordinary and beautiful specimens of pigs, almost exceeding belief, in taking age into account. Their weight very great in proportion. Colour, black, with very thin hair.—1st prize and gold medal.

258 William Mills Barber, of Langley Broom, near Slough, Bucks, a pen of three 24 weeks and 2 days Improved Middlesex, bred by exhibiter, and fed on middlings, boiled potatoes, barley and pea meal, and skim milk.

Very thick, compact forms, and heavy; colour, white.—2nd prize.

Class XXXII.—Pigs of any Breed, above 26 and not exceeding 52 weeks old.

262 John Coate, of Hammoon, near Blandford, Dorset, a pen of three 47 weeks and 6 days Improved Dorset, bred by exhibiter, and fed on barley meal, pollard mixed with whey, roots, and dry beans.

This is a pen of three immense pigs with well-formed frames, being compact and regular throughout, with thin hair, backs broad and level, heads fine, ears small and pricked, snout and face small and short. These specimens show a rather coarse quality of meat, but the breed or kind by no means denoted.

266 Samuel Druce, of Eynsham, Oxford, a pen of three 38 weeks and 2 days Improved Oxfordshire, bred by exhibiter, and fed on wash, skim milk, and barleymeal.

Three well-formed, good pigs, of excellent quality; colour, black.—No prize.

Class XXXIII.—Pigs of any Breed, above 12 and under 18 months old.

275 Samuel Druce, of Eynsham, Oxford, a pen of three 66 weeks Improved Oxfordshire, bred by exhibiter, and fed on wash, skim milk, and barleymeal.

Three very large, good pigs, similar to Class 32; good quality of deeply-formed flesh.—1st prize.

276 Stewart Marjoribanks, of Bushey Grove, near Watford, Herts, a pen of three 65 weeks and 2 days Improved Bushey, bred by exhibiter, and fed on toppings, skim milk, offal, and barleymeal.

Very large and very good; worthy of the second prize.

EXTRA STOCK.

Pigs.

256 His Royal Highness Prince Albert, a pen of three 23 weeks Windsor, bred by exhibiter, from the stocks of His Royal Highness and Mr. Ambler, and fed on barley-meal and skim milk.

This is a beautiful specimen of what is commonly known as the small breed; he is very large for the breed; a very broad, good frame, and excellent quality of flesh (this pig quite retrieves the character of his Royal Highness's herd.) We did not think the pens shown in the classes above of surpassing excellence.

No. 287 in this class is a monster in size, but well formed.

In concluding our report of these classes, we must say a word upon the pig classes. The celebrated Coleshill breed, though fairly represented, are not equal to former years, and we miss the class of fine porkers, of the kind bred by Mr. F. Hobbs and others of the same school. As a whole, with the exception of class 31, we do not think the pig classes so well sustained as usual. The pen shown by Mr. Williams have attained a most extraordinary weight in 17 weeks, and perhaps have never been exceeded; and the immense one shown by Mr. Majoribanks shows what may be done in attaining great weight; but for all purposes of domestic service, our taste lies in the kind introduced on the Royal Farms—taking the specimen shown in the Extra Stock class as the representative of the breed.

Agricultural Roots.

We were much pleased by an inspection of the standing of Messrs. Gibbs, corner of Half-moon-street. A drum-head cabbage was pointed out weighing 31½ lbs.; various roots of mangel-wurtzel, of Long Red, weighing from 15 to 21¼ lbs.; Yellow Globe do. attaining to 21¼ lbs. weight; Red Globe do. 18 lbs. The variety of Long Red is said to have produced this season 56 tons per acre, and grown by Mr. Smith, of Harrow Weald, Middlesex. We were greatly interested in seeing several specimens from the Royal Farms—Yellow Globe mangel-wurtsel, weighing 21 lbs., from the crop which won the first prise of the Royal East Berks Association; several specimens of Purple-top Swede, from the same farms, of very large size: we saw no specimens elsewhere to equal them: the quality is very superior: they were supplied from Messrs. Gibbs' establishment.

Mr. Skirving exhibited some very fine specimens of his variety, and many other common varieties—carrots, red and white, very good.

Mr. Sutton had some good specimens of his Lincoln Red Rounds: we know of no common variety to equal it.

Mr. Chivas attended with specimens of his Orange jelly turnip: it seems almost equal to a melon in shape, and also in sweetness of taste, but we think it is not possible to grow any great weight per acre.

Mr. G. Gibbs' Stand was well supplied with useful varieties of mangolds and turnips: his stocks are well-known and appreciated, but we saw nothing worthy of especial notice on his stand.

Mr. Isaac Wright attended with a new variety of Orange Tankard Swede; but, from the specimens he exhibited, we do not augur much improvement.

Mr. Jas. Grove's mangolds were of good quality, but small: by no means so large as he usually shows from his excellent stock.

Mr. Skirving's Fluke potato is a very flat-shaped variety, *fluke shape*, or a flat oval; colour, white; and appears to us not large enough to yield greatly in ordinary culture.

In concluding our report, we beg to express our great gratification at the result of the meeting: seldom have we had such a successful one. We rejoice to see our Princes and Nobles competing in friendly rivalry with the humbler classes for the various prizes, and many of which they have deservedly carried off. What a contrast to the feudal ages!—no danger of the prophet's warning, "Woe to thee when thy princes eat in the morning," *i. e.*, luxuriate instead of attending to useful duties and employments. We trust the efforts of the Smithfield Club will long be blessed with great prosperity, and realise many such interesting meetings.

THE SHOW OF IMPLEMENTS.

The show of implements and machinery, now that everything is in its place, is fully as favourable as what we expected last week. The rather limited amount of space naturally makes the articles more select than otherwise they would be, with fewer doubles, but not to that extent which might be expected. At the same time improvement has obviously been made in this respect on the present occasion. About 313 stands, 5½ by 4½ feet, have been divided among 88 exhibitors; some occupying only one, others upwards of a dozen, while a few have not made their appearance. We shall take exhibitors in the order of their stands, and endeavour to give a short paragraph to each.

Thomas Gibbs and Co., Halfmoon-street, seedsmen to the Royal Agricultural Society have a better selection of roots (all from their own seed) than we expected it was possible to have exhibited this year. Several specimens of swedes and mangel grown by Prince Albert (and for which his Royal Highness has gained the silver cup of the Royal South Bucks Agricultural Society, and prizes from the East Berks Agricultural Association respectively, *for* two years running), are excellent even for the best turnip seasons, and those of the Duke of Bedford and Sir John Cathcart are little inferior, while Mr. Howard has one fully equal. The specimens of kohl rabi and Belgium carrots, the latter grown by Col. Challoner, are also remarkably fine. Seeds are fully up to expectation as to quality; and in variety, far beyond enumeration.

Thomas Bigg, of Great Dover-street, exhibits his "Composition" and "Sheep-dipping Apparatus," whose value to every flockmaster is so well known and appreciated.

Mary Wedlake and Co. show a variety of corn and cake crushers of different sizes; also turnip and chaff cutters, a haymaking machine, a lawn mowing machine, and domestic flour mills, well adapted for emigrants, either with French burr stones or steel. They also exhibit a gorse mill, an article which recommends itself to more than farmers, for in the neighbourhood of this great metropolis we could point out hundreds of acres which would return much more profit under gorse than grass, because the former would be invaluable green food during winter to the cows of private families, who, if they once tasted gorse butter and cream, would give a long price for such green food.

George Gibbs and Co., Down-street, Piccadilly, exhibit a large variety of roots and seeds. The former exemplify the unfavourable nature of the season for turnips, but the specimens nevertheless are very good. The samples both of the cultivated and natural grasses are excellent.

Thomas Lloyd and Son, 15, Old-street Road, are the exhibitors of domestic steel mills and corn bruisers, of the best workmanship and material; and although many object to the former without assigning a valid reason, we could contrive to make a family brown loaf at sixpence with them, instead of elevenpence as we are now paying, a difference of some importance in domestic economy.

James and Frederick Howard, Bedford, of their large assortment, exhibit as samples their first prize F and FF ploughs; also, two different sizes of prize harrows. These form but a very small representation of this firm's stock, but they are very select. Their ploughs have long been justly celebrated in every province of the kingdom, and the recent improvements made upon them have brought them to a very high degree of perfection. Their success during the past season bears ample evidence to this.

R. Hornsby and Son, Grantham, Lincolnshire, exhibit a corn-dressing machine, manure and seed drills, chaff-cutter, cake-breaker, and their portable engine and thrashing machine below stairs. The most sanguine of this celebrated firm's supporters must have been more than satisfied with their successes during the past year; and the small selection from Spittlegate Iron Works, in the Bazaar, possesses the highest merit. It would be superfluous to say that the materials, mechanism, and workmanship are of the very best quality, and yet we never examine either without feeling a silent pleasure in acknowledging both. The agricultural world is much indebted to *Hornsby* and Son.

Wm. Pierce, 73, Mark Lane, London, shows a miscellaneous group too large and variegated for individualising. Among the most conspicuous are a "patent spring shaft agricultural cart," and a ditto "safety car," on the merits of which we feel some reluctance to speak, for the want of experience. It is otherwise, however, with a series of Cornes' prize chaff-engines, corn-crushers, linseed-mills, and domestic flour mills.

William Skirving, Liverpool, complains very much of the season on the west coast for root crops, nevertheless his swedes maintain their usual respectable appearance in the vegetable department of the Bazaar. We should have had no difficulty in recognizing to whom they belonged, in comparing them with the others; their native characteristics standing prominently out. His mangolds are also very good for the season.

B. Samuelson, Banbury, exhibits his digging machine; a powerful instrument in loosening the soil and turning up weeds. On this series of stands we find Gardner's turnip cutters, another excellent article, one whose well-earned popularity is as fresh as ever in every province of the kingdom. Also corn-bruisers, bean-mills, chaff-cutters; and Anthony's far-famed American churns.

Richard Coleman, Chelmsford, has brought forward his "Patent drag-harrow, cultivator, or scarifier," a most useful and effective implement. He also shows his expanding harrows, and corn-dressing machine—superior articles.

Richard Garratt and Son, Saxmundham, have, as usual, a fine show of implements and machinery, consisting principally of drills and thrashing machines, driven by steam or horse power. The money prizes and medals which this firm have received would make a handsome little fortune to a farmer. Below stairs they exhibit their portable steam-engine, with a combined thrashing and dressing machine; and upstairs a horse-power portable thrashing machine. Besides their prize seed and manure drills for flat or ridged work, they also exhibit a machine for sowing grass-seeds by hand, Huckvale's patent prize revolving turnip hoe, with some superior chaff-cutters, cake-bruisers, a dressing machine, &c.

William Coulson, Fetter-lane, York, exhibits a very ingenious and highly-meritorious mortising and boring machine, capable of mortising all sorts of wooden work connected with agriculture, as gates, fencing, &c. The boring part is added (under patent) very lately, and greatly enhances its value.

James Grove, Chelmsford, exhibits roots of a very fair quality, considering the season.

Arthur Lyon, Finsbury, London, exhibits mincing, pulping, and sausage-machines of the highest value in culinary affairs, and which doubtless ought to find a place in the farmer's kitchen.

Thomas Edrington, 17, Smithfield-bars, shows an assortment of sacks, rick-cloths, and articles of this kind, all of the best quality. There is scarcely any department of the farm which requires greater circumspection to manage it properly than this, and which creates greater loss when otherwise.

Burgess and Key, Newgate-street, exhibit pumps of different kinds, gutta percha tubing, dairy utensils, draining tools and digging forks, chaff cutters, cake and corn bruisers, &c. They also show a model of an improved reaper, with screw gathering apparatus, which screws round the corn into a swathe. The enslaving labour of the man who works the rake of the American machines is justly condemned by every one who practically knows anything about labour, or who has any fraternal feeling in his bosom for his fellow-creature; and while this is an honest acknowledgment of the evil itself, it is also a laudable endeavour to get rid of it—with what success in the field we are, as yet, unable to say; but on the carpet is very interesting.

Hugh Carson, Warminster, Wilts, exhibits his root-pulper, and also a chaff-cuter, both good articles.

William Crosskill, Beverley, Yorkshire, shows his improved Bell's reaper, about the best of all the reapers yet in the field; inasmuch as it abridges labour in the greatest degree, doing away with the slavery of the man and rake. To lose sight of this important fact is to lose sight of the very object of machinery. Mr. Crosskill also exhibits two of his prize carts, one of his far-famed clod-crushers, and his Archimedian root-washer.

E. R. Turner, Ipswich, have exchanged two stands with Mr. Crosskill, giving him 39 and 41, to accommodate his reaper, and receiving 109 to 111 in return, on which he shows on excellent four-horse fixed engine, his prize linseed-bruiser, corn and cake-crusher, and a chaff-cutter—all superior articles.

John Warren and Sons, Jermyn-street, have a fine assortment of pumps deserving of special notice.

Ransome and Sims, Ipswich, have an invaluable selection, both above and below stairs. Their portable engine and combined thrashing and dressing machine can scarcely be beat, while their ploughs are superexcellent. What we have said of ploughs may justly be said of their fixed engines, of which one (a four-horse power) is shown as a sample. Their stable furniture, chaff-cutters, corn and linseed-mills, again, are also prize articles, ranking high in public estimation. They also show harrows, turnip-cutters (Gardner's), &c.—articles of the highest merit.

Barnard and Bishop, Norwich, exhibit pig troughs and turnip pulpers—high in merit.

Smith and Ashby, Stamford, have samples of their prize hay-making and chaff-cutting machines, including a hand and horse-rake, also a cart and cake-breaker—first-rate articles in their respective classes. The improvements in their hand chaff-engines are deserving of special commendation.

R. and J. Reeves, Bratton, Westbury, exhibit two liquid-manure drills—the one, a Chandler; and the other, on what is believed to be an improved plan. The merits of this latter, from erroneous entry at Lincoln, could not be officially recognized, but it is hoped will be otherwise at Carlisle. The former has been sold to His Royal Highness Prince Albert, for Norfolk Farm.

George Chivas, Chester, as usual has an invaluable selection of his "Orange jelly turnips."

Richmond and Chandler, Salford, exhibit fine samples of their chaff-cutters and corn-crushers, for hand, horse, or steam-power, as required.

Wedlake and Dandy, Hornchurch, Essex, have their usual selection of corn-crushers, bean and cake mills, turnip and chaff cutters. Very useful articles.

William Dray and Co., Swan-lane, London. A large variety of chaff and turnip cutters; corn, cake, and linseed crushers; steel and French burr-stone, domestic mills, dressing and weighing machines, barley hummellers, American churns, &c. They also show their Lincoln Prize Hussey Reaper, in whose favour so much has been said. Little money is a powerful monitor, and has exercised its full influence among more than merely practical farmers; hence the prudent plan of a special award being appropriated to cheapness. In this respect Hussey's machine has not a rival as yet; and from the high degree of perfection to which W. Dray and Co. have brought it, the finding of one will not be an easy task. We are far, however, from throwing obstacles in the way of the inventive world by supposing it is impossible to make a cheaper machine than even this is. This firm also shows a very ingenious Belgian manure and seed dropper, worthy of the notice of gardeners and small farmers under spade husbandry, while for large farms they would be useful for blanks and headlands.

Signor Carlo Minasi, Brecknock-place, Camden-road, also shows his patent hydro-incubator on their stands, which possesses the highest degree of merit. Clucking hens have always been experienced as an eternal annoyance about every farming establishment, and as it is said that "three dips in the dam will make a clucking hen lay again," we wish Signor Minasi every success at our Christmas Meeting, for both pleasure and profit in the management of poultry are obviously greatly in his favour.

James Smyth and Son, Peasenhall, Suffolk, exhibit four seed drills of different sizes, and also a manure drill. This firm fully maintains its well-earned reputation for the manufacture of these things.

Nye and Co., Wardour-street, Soho, have fine specimens of their patent mincing machines.

Mr. Medworth, of the agricultural department of the Bazaar, only retains three stands, on which he shows steaming apparatus of the first quality, Adam's patent flour mill, and one or two small things which the implement makers, whose interest he usually superintends, cannot exhibit themselves.

W. C. Cambridge, Bristol, exhibits four specimens of his roller, two upstairs and two below.

Croggan and Co., 2, Dowgate Hill, London, show samples of their patent asphalte roofing-felt, in whose favour so many testimonials have been published.

J. H. Cuff, Smithfield, exhibits his cattle medicines, well known among farmers and veterinary surgeons.

Fred. Haines, 22, Lime-street, London, shews Jones and Co.'s patent gutta-percha sheep-boots and foot-rot power. Ought not all our heavy fat sheep to be sent to market in these boots?

Freeman Roe, 70, Strand, exhibits a few fine specimens of hydraulic machinery and apparatus, for which his establishment is held in high reputation.

Barrett, Exall and Andrews, Reading, have a very superior selection from their choice stock of prize machinery, both above and below stairs. In the former they exhibit their far-famed horse-gear, also a saw-table and chaff-cutter, specially commended at Lincoln; corn and cake-crushers, barley-hummellers, &c.; and in the latter case, a portable engine with a combined thrashing and dressing-machine, and a fixed engine, in whose favour too much cannot be said.

Clayton, Shuttleworth and Co., Lincoln, have long occupied a very enviable position in agricultural mechanics; more especially as to portable and fixed engines; and on the present occasion fully maintain their ground. Below stairs they exhibit a portable engine with combined thrashing and dressing-machine, and upstairs a fixed engine, a saw-table, chaff and turnip-cutters, and corn and linseed-crushers. All these things exemplify in the most satisfactory manner the high degree of perfection to which this firm has attained in the manufacture of heavy machinery of every kind, justly meriting that honourable and marked esteem which it has always received of the agricultural world.

Hill and Smith, 53, Watling-street, exhibit a portable field hay-rack for sheep, iron hurdles, gates, galvanised and other wire-netting, with several chaff-cutters. All excellent articles.

Robert Maynard, Whittleford, Cambridge, shews a good cake-breaker.

W. L. Nicholl and Co., 16, Aldersgate-street, London, exhibit corn-measures and weighing-machines, domestic scales and weights, all of the best quality; also turnip and chaff-cutters of various sizes.

W. P. Stanley, Peterborough, exhibits two sets of steaming apparatus, for which he has justly acquired pre-eminent distinction. The proper cooking of food for stock is a question second to none in agriculture, and this firm has done much to solve it. He also shows compound steel mills and corn bruisers of high merit.

W. Busby, Bedale, Yorks, shows his far-famed prize ploughs and carts, as also drill horse hoes. These are articles of the highest merit and most deserved celebrity.

Richard Read, 35, Regent Circus, London, exhibits bullock-probangs and garden-syringes of various kinds; they are both of the best quality and description, and are indispensable articles to farmers and gardeners.

J. A. Williams, Baydon, Hungerford, shows his "Patent self-holding lever-plough and cultivator." It has long been a cherished desideratum among ploughmen to get a plough to go of itself without holding, and our Christmas exhibition of this year bids fair to solve the problem by Mr. Williams' trifurrow plough, which goes on three wheels, requiring no one to hold it. Each of the three ploughs has a lever for regulating the depth of the furrows, with the necessary contrivances for fixing their breadth. We do not much admire the ploughs, but they are moveable for the grubbers or cultivators, of which there are four, with an additional lever; hence a Howard, a Ransome, or a Busby plough may easily be substituted, which silences this objection. The machine is adapted for steam or horse power, and obviously prognosticates a new state of things; but experience in the field, of which we have none, is absolutely necessary before judgment can be safely awarded as to merit; at the same time we may observe that, from experiments made, the patentee is sanguine as to results; for ploughing-in seed in soils liable to "spew out the young plants," it may prove "a great affair," as he thinks it will.

Robert Hunt, Earl's-Colne, Essex. exhibits his "Improved engine for drawing clover," with a dressing-machine combined; thus delivering the cloverseed ready for market. Mr. H. also shows hand-manure and seed drills, chaff-cutters, and an Essex scythe—all worthy of notice.

James Ridgway, Piccadilly, has a valuable farmer's library. He is, as our readers are doubtless aware, pre-eminently the agricultural bookseller of the capital.

Henry Clayton, Atlas Works, London, shows samples of bricks, tiles, &c., made by his patent machines, now in operation, as noticed last week.

William Smith, Kettering, exhibits two dressing-machines and an improved horse-hoe—articles of high merit.

James Hayes, Elton, Oundle, shows two superior grinding mills, with Derbyshire Peak stones—much approved.

James Matthews, 5, Upper Wellington-street, Strand, brings select works in connexion with agriculture and horticulture.

James Dobbs, 7, New Orchard-street, Bath, an excellent spirit level, with stand and staff.

R. H. Nichols, St. John's, Bedford, exhibits his patent universal horse-hoe, which has several mechanical advantages in its favour—as the easy mode of steerage when the corn drills are crooked, and the regulating of the depth of the hoes in going over an unlevel surface. Groundless objections have been raised as to its clumsy form; but we can certify that it is not too heavy for the cold clay lands of Huntingdon, and others of a similar character. Whether it could be made lighter and yet of sufficient strength, and to have weights attached, like those of drills, so as to meet the wants of light lands, is a suggestion we throw out to the patentee, not in the shape of an indirect objection, but, if possible, to attain to a greater degree of perfection.

F. Phillips, Hall-farm, Brandon, Suffolk, exhibits his Lincoln prize patent root pulper. The reduction of roots to a pulp for the mixing with ground corn and chaff, is a proposition which has very justly met with general approbation, and the machines are among the best pulpers manufactured.

Tuxford and Sons, Boston, exhibit their prize fixed and portable engines, and a combined thrashing and dressing machine—articles for the manufacture of which this firm has long been justly famed. In construction and manufacture their portable engine developes the highest degree of mechanical skill and workmanship, in evidence of which we have only to mention that it has been selected by the Governments of France and Prussia for the Museums of Art and Agriculture of those two empires, and by our own Government in her Majesty's dockyards. The incasing of the working machinery, or parts at the end of the boiler, under the immediate eye of the engineer, is universally admired. Similar characteristics of usefulness and durability recommend their fixed engines and thrashing machines.

William Williams, Bedford, exhibits his celebrated pipe machine, which has procured no less for himself than purchasers, so much satisfaction in many a yard. Independent of all the new machines which have from time to time appeared, it still maintains its popularity wherever introduced. He also shows his prize harrows, drill horse-hoe, hay rake, and chaff-cutters of different sizes, which have long met with the highest approbation.

James Wood, Stowmarket, exhibits a horse-power intermediate motion crushing and grinding mill for corn and linseed, also turnip and chaff-cutters, all of which are useful articles.

E. H. Bentall, Heybridge, Maldon, shows one of his prize patent broad-share and subsoil ploughs, a powerful instrument in loosening soils; also turnip and chaff-cutters, cake-mills, and pig-troughs, admirably adapted for their respective purposes.

Wm. Cowley, Newport Pagnell, Bucks, exhibits his improved tipping-cart, with vulcanized India-rubber springs, and horse hames, which have both been much admired.

Benjamin Edgington, 2, Duke-street, Borough, exhibits excellent samples of his rick-cloth, sacks, sheep-netting, and articles of this kind well-known to farmers in every province of England.

McNeil and Co., of Bunhill-row, London, exhibit samples of their patent asphalted felt for the roofing and ceiling of houses; for putting under slates so as to exclude frost in winter and heat in summer. For these and other similar purposes this felt has now acquired a lasting fame.

Mathew Gibson, Newcastle-on-Tyne, exhibits his clod-crusher, and digging machine.

Joshua Warren, Maldon, Essex, shows an assortment of various kinds of Essex ploughs; also a turnip-cutter and cake-bruiser.

John Bennett, 65, Cheapside, exhibits a vast variety of barometers, thermometers, and instruments of this kind, all of the best description and quality.

Cottam and Hallen, of Oxford-street, have fine specimens of stable furniture, including patent enamelled mangers, water-troughs, &c., &c., well worthy the attention of everyone who keeps a horse. They also exhibit an excellent saw-table, with many other useful inventions.

J. Kealy, Oxford-street, has a great variety of his patent turnip-cutters, which have met with considerable approbation.

James Burton, 370, Oxford-street, exhibits his "patent stable fittings," plain, enamelled, and galvanized; hay-boxes, mangers, and water-troughs. His improved enamelled fittings, and method of fixing the halters, are highly meritorious, and ought to find a place in every well-managed stable. He also shows "patent ventilating chimney-caps" of merit.

Sutton and Sons, seedsmen, Reading, exhibit fine specimens of roots, both swedes, mangold, Lincolnshire red globe, and drum-head cabbage. Sutton Elvetham long red mangold and Ashcroft swedes are super-excellent for the season.

James White, 266, High Holborn, has a fine stock of flour-mills in active operation; the best possible method of showing to visitors and purchasers their merits.

William Ball, Rothwell, exhibits four of his prize ploughs—superior articles.

John Eaton, Kettering, exhibits a very ingenious circular hay-rack for sheep, and a powerful little jack.

Edward Weir, Bath-street, City-road, London, exhibits fire-pumps, hose and hose-reels, draining levels, and sanitary powder. His pumping apparatus and drain levels are excellent articles. As for his sanitary powder, we can only recommend it for a trial, leaving experience to award its fair sentence of merit.

John Whitmee, Ray-street, Clerkenwell, has an assortment of good domestic steel and French Burrstone mills, oat, barley and bean crushers.

William Cullingford, Edmund-terrace, Islington, exhibits garden and sheep-netting; also rabbit, bird and fishing nets. These articles are patronised by the nobility and gentry; are also generally approved of by gardeners, farmers, gamekeepers, and other practical men.

Henry Goddard, Nottingham, exhibits an excellent kitchen fire range and steaming apparatus.

George Stacey, Uxbridge, three chaff cutters and two barley hummellers. Very useful and effective machines.

H. A. Thomson, Lewes, levels and surveying instruments of the best description. The telescope and economic draining levels are probably the best in the kingdom, and have received from the Royal Agricultural Society its gold and silver medals during both the last years.

Isaac Wright, Great Bently-street, Colchester, exhibits agricultural seeds and roots. The former fine samples; the latter a little injured by the season.

C. T. Hallifax, 315, Bedford-street, farm account books. What no intelligent farmer can do without, although we fear there are some who have nothing of the kind as yet!

Barry Brothers, Meriton's Wharf, Dockhead, exhibit samples of "Long's Specific," "Long's Preservative," and "Long's Foot-rot or General Lotion." Articles well known to every shepherd and farmer.

Edward Dowling, 2, Little Queen-street, Holborn, weighing machines. Better articles were intended for this stand we were told.

Hely and Waring, 296, Oxford-street, Managers of the Cosmopolitan Glass Company, exhibit a variety of glass dairy utensils, such as milk pans, cream pots, hand churns, and milk measures; Lord Camoys' syphon, churn thermometers, lactometers, &c. Also horticultural articles, as fern shades, wasp traps, Lord Keane's bee glass, &c.

Holmes and Son, Norwich, exhibit, on the first gallery, a manure-distributor, a turnip-seed and manure-drill, three corn-dressing machines, and a barley-hummeller; and below-stairs, their portable engine and combined thrashing and dressing machine. This is one of our oldest and most successful firms; and this year, its Christmas selection is well made, all the articles shown being in general request at this period.

Professor Simonds brings his essay on the age of live stock, an interesting topic for every farmer.

Tree and Co., 22, Charlotte-street, Blackfriars-road, exhibit Ewart's cattle-gauges, which few intelligent farmers now want; also, Bedington's patent horse-halters.

In comparing these observations with our note-book, we find many details in the latter, of necessity avoided, for want of space. The brevity of our remarks may demand indulgence, but no apology. We never have, on any previous exhibition in the bazaar, had so little occasion to find fault, or so much good cause for general commendation. As a whole, the exhibition may be taken as an index that the state of British agriculture is highly prosperous, while it proves in the most satisfactory manner that our implement-makers are not so far behind the other arts in the manufacture of machinery as many imagine, and that farmers are following them as fast as the stubborn circumstances of the soil will permit. In the seed and root department we have a very satisfactory appearance.

THE GREAT SMITHFIELD CHRISTMAS CATTLE MARKET, MONDAY, DEC. 11.

This being the day appointed for holding the Great Christmas Cattle Show, the usual bustle and excitement invariably witnessed on this occasion were apparent at an early hour. The great difficulties experienced during nearly the whole of the present year in rearing adequate supplies of what may be termed fat stock for this and other markets, and the unusually bad condition in which the Beasts have come to hand during the past six months—indeed, we may state that fully two-thirds exhibited here since the latter end of June have been beneath the middle quality—led many parties to conclude that there would be a great comparative deficiency in the supply for Christmas consumption. Although there were some deficiences, to which we shall presently allude, the show, taken as a whole, was a very good one, and kept up its long-established character. In bringing the leading breeds under particular notice, we may observe that the changes in the mode of exhibition in the show-yard in Baker-street have been productive of a great amount of benefit, because they are keeping pure blood amongst our stock, and thereby enabling us to fall back upon a reserve, in the event of cross-bred animals becoming deteriorated, the value of which can be scarcely estimated. To-day's market strongly illustrated these remarks. In former years, we have been accustomed to witness a good supply of beasts from the West of England; in other words, the number of Devons has formed a heavy portion of the arrivals. To-day, that breed reached us to an extent seldom before witnessed, and of weight and quality which surprised the most experienced breeders. This we look upon as one of the results arising from placing the Devons as the first-class beasts in the show-yard. To show the strength of this portion of the supply, we may observe that there could not have been less than 1,600 pure Devons on sale, many of them weighing from 180 to 200 stones, and very few under 150 stones of 8 lbs. The prices realized for this particular breed was nearly on a par with those obtained in the corresponding week in 1853.

We now come to the Herefords. This portion of the supply was, if anything, far superior—taking weight, condition, and quality into consideration—to most former seasons. Many of the beasts were of enormous weight; indeed, numbers of them were superior to any shown in the second class in the yard last week. The high prices paid for this particular breed during the whole of the present year, and the almost total absence of disease amongst it, have operated as a great incentive to the breeders, whose gains have greatly exceeded almost any former season.

But we have yet to enlarge upon another portion of this great exhibition, viz., the Shorthorns. From nearly all parts of England, but more particularly from Lincolnshire, Leicestershire, Northamptonshire, and Norfolk, noble, well-proportioned, and bulky animals reached us. The value of this portion of the supply it would be impossible to estimate; and we congratulate the feeders in having forwarded so splendid an addition to the aggregate numbers. This breed has certainly lost none of its excellent points from being placed in the third class by the Smithfield Club. And here we would remark that the heavy breeds of beasts have this season failed to come up to their accustomed weight, from reasons already explained.

More than the usual number of wonderfully fine Scots, bred in England and Scotland, were in the market. In our opinion they formed one of the most interesting features, notwithstanding their *colour*. And when we consider the great value of this breed—indeed, a more valuable one does not exist—we are led to the practical conclusion that it has never received fair play at the hands of the Smithfield Club. If the committee can point out to us a superior class of beasts, we will at once admit that we are wrong, but not before.

As regards the various other breeds shown this morning, we may intimate that they did not exhibit any points worthy of particular observation; however, the show in this respect was a good one.

There was about an average supply of foreign stock in the market, but its general condition was very inferior; and it is a remarkable fact that little or no improvement has taken place in it since the passing of the present tariff laws, notwithstanding that we have paid the Dutch graziers high prices for both Beasts and Sheep.

Last week's imports of foreign stock into London amounted to 5,831 head. In the corresponding week in 1853 we received 4,795; in 1852, 4,869; in 1851, 3,628; in 1850, 5,734; in 1849, 3,720; in 1848, 3,155; and in 1847, 1,913 head.

IMPORTS INTO LONDON LAST WEEK.

From Whence.	Beasts.	Sheep.	Calves.	Pigs.
Rotterdam	562	1083	256	—
Ostend..................	—	—	3	—
Harlingen	322	1462	5	—
Amsterdam...............	22	401	—	—
Hambro'.................	102	203	—	—
Dordt...................	47	—	10	—
Nieu Diep	43	312	—	—
Antwerp.................	—	—	3	—
Total ..	1098	4461	274	—

The Yearly Comparison of Weekly Imports is as under:

	Beasts.	Sheep.	Calves.	Pigs.
1853	988	3655	128	24

It is supposed that nearly five thousand of the Beasts were brought into London by the various railways. Allowing nearly one hundred miles for each Beast to travel, it would require nearly six hundred engines to draw this immense bucolic supply to the metropolis. The companies generally made the most perfect arrangements to forward the stock, and great credit is due to them for the promptitude with which they met this heavy demand upon their locomotive power. The city authorities exerted themselves to provide space for the supply, yet a large portion of the Beasts was placed in some of the adjacent streets. The evil of the want of adequate accommodation will no longer be felt, as the trade of this market will be removed next month to Copenhagen Fields.

The following are the numbers of Beasts exhibited, and the prices obtained for them, on the Great Days during the past fifteen years:—

Year.	Beasts shown.	Prices.				
		s.	d.		s.	d.
1839	5,074	3	4	to	5	0
1840	3,528	4	4	,,	5	8
1841	4,500	3	8	,,	5	0
1842	4,541	3	4	,,	4	8
1843	4,510	2	8	,,	4	4
1844	5,713	4	0	,,	4	6
1845	5,326	3	6	,,	4	8
1846	5,470	4	0	,,	5	8
1847	4,282	3	4	,,	4	8
1848	5,942	3	4	,,	4	8
1849	5,765	3	4	,,	4	6
1850	6,341	3	0	,,	3	10
1851	6,103	2	8	,,	4	2
1852	6,271	2	8	,,	4	0
1853	7,037	3	2	,,	4	10

Although we have described the Beasts as of excellent quality, it must be understood that the total number in the market was not equal to the supply exhibited at the same period in 1853; neither was the aggregate show so prime in quality, arising from numerous low breeds brought forward. The primest animals may be thus referred to: Mr. Robert Morgan exhibited some first-rate stock, the property of his Royal Highness Prince Albert. The same salesman showed some wonderfully fine shorthorns, belonging to Mr. Robert Cook, Mr. W. Thomas, and Mr. W. Goodall, Lincolnshire graziers; Mr. Thomas Feltome, Mr. R. Leeds, and Mr. Alday, residing in Norfolk; and Scots from Mr. Milne, Mr. Martin, Mr. Cooper, and other graziers in Scotland. Mr. D. Maidwell exhibited 40 extraordinary Scots, bred by Mr. MacCombie, of Tillyfour, Aberdeenshire. These Scots were decidedly the best in the market. Mr. D. Vorley showed some good Scots forwarded by Mr. Attenborough, of Brabrook, Northamptonshire, and from Mr. Martin and Mr. Knowles, of Aberdeenshire; also some prime shorthorns from Mr. Wright, of Tring, Norfolk. Mr. Dixon brought forward some very fine shorthorns, the property of the Marquis of Exeter; shorthorns fed by Mr. William Thomas, of Holbeach Marsh, Lincolnshire; Herefords bred by Mr. Marshall, near Banbury; and shorthorns the property of Mr. John Little, of Whittlesea. Messrs. Giblett and Gurrier showed 50 very fine Scots, belonging to Mr. W. Mile, of Aberdeenshire; also several lots, the property of Messrs. Stuart, Sheppard, Martin, Knowles, and others, together with 80 Spanish Oxen.

As regards the Beef trade, we may observe that, owing to the favourable state of the weather, and the large attendance of country butchers, many of whom purchased extensively, it was decidedly firm, and prices were on the advance. A few very superior Scots realized 5s. 6d. per 8lbs., and the general top figure for Beef was 5s. 4d., at which a good clearance was effected.

Notwithstanding that the supply of Sheep was not to say very superior, there were some remarkably fine animals on sale. Messrs. Weal exhibited 70 prime Downs, fed by His Royal Highness Prince Albert; 56 Downs, the property of E. F. Whittingstall, Esq., of Langley Bury, Herts; and 100 Gloucester Ewes, belonging to R. Rowland, Esq., of Crealow. Messrs. Weal had also some prime Sheep from numerous other graziers. Mr. Eland exhibited 50 superior Lincolns, belonging to Mr. Hornley, and others. Mr. W. Gurrier showed 20 heavy Cotswolds, the property of Mr. W. Hewer, of Northleach. These animals realized from £4 10s. to £6 each. Also 15 Cotswolds forwarded from Wiltshire, and which averaged £5 per head.

We had a good demand for all breeds of Sheep, and in most instances prices advanced 2d. per 8lbs. A few very superior Downs sold at 5s. 4d., and the general top figure was 5s. 2d. per 8lbs.

The show of Calves was limited; and the Veal trade ruled steady, at last Monday's prices. The highest figure was 5s. 6d. per 8lbs.

Pigs were in fair average supply and moderate request, at our quotations.

From Lincolnshire, Leicestershire, and Northamptonshire we received 2,000 Short-horns; from Norfolk and Suffolk, 800 Scots, Herefords, &c.; from other parts of England, 2,000 of various breeds; and from Scotland, 600 horned and polled Scots.

GRINDING CLINKERS FOR POTATOES.—The grinding of clinkers (as of other vitrified matters) is much facilitated by quenching in water, when red hot. They become full of cracks, and quite tender; in many cases as easy to grind as loaf sugar. This would be easily done on the large scale by heating them in a limekiln, and turning them out redhot into a stream of water. On the small scale they may be fired in heaps, with gas brize, or small coal; and when redhot, shovelled into a stream, or pool: sprinkling would hardly crack them enough; and the ashes of the brise or coal will be just as good as the clinkers. I have known potatoes dressed with coal ashes quite sound, while those all round were diseased.—J. PRIDEAUX, *Plymouth, Dec.* 5.

WHY IS A GARDEN FRUITFUL?—The almost universal opinion is, because it is more highly manured than fields, and therefore has a richer soil. Yet this is not always the case. There are other things to be attended to, in order to render the soil prolific. One is to pulverise the soil; though this may seem a small matter to many of our would-be farmers. But it is owing to the finely pulverized condition of the beds of a garden that it possess a highly absorbent power to attract the moisture of the atmosphere—a source of fertility that many farmers scarcely seem aware that they possess. If the soil of the field was as carefully worked, and fresh earth constantly exposed to the atmosphere, as in the well-attended garden, the land would increase each year in fertility. Let the rule be, plough deep, cultivate well, pulverize lumps and sods, return your straw to the soil, and you may carry off an immense quantity of food, and have fertile soil still. Plants in their nature are organized beings. By means of their roots they take up food from the soil, and often the very food which the soil has taken up, by its power of absorption, from the atmosphere, and which power is increased to an almost indefinite extent, by separating the particles of which it is composed. The acts of ploughing and harrowing are a part of the process of manuring. The act of stirring the earth, in times of drought, serves as a watering of the plants. The moisture thus absorbed is loaded with fertilizing properties. If, then, you would have your fields as fertile as a garden, you must not depend upon manure alone, but pulverize freely, not upon the surface, but *deep below it.*

THE PRIZE SHEETS OF THE ROYAL AGRICULTURAL SOCIETY.

I have been a member of the Society from its commencement, and no one rejoices more than myself in the great success that has attended its operations. All honour to those active and persevering men who have so arduously worked, and brought it to the unexampled position it now holds; amongst whom one cannot withhold the just meed of praise so eminently due to the talented and indefatigable secretary—Mr. Hudson—who has uniformly been unremitting in his exertions to promote the prosperity of the Society, and to whom it is undoubtedly greatly indebted both in the conduct of its Journals as well as its general business, for the high and exalted standing it has attained.

Having on several occasions had the pleasure and honour to officiate as one of "the Judges," I have been enabled more advantageously to form my own opinion upon many points connected with the Show and its general utility, and will presume, through your columns, to give some suggestions relative to alterations which I think might with manifest advantage be made in the Prize Sheets for the ensuing year, and most respectfully commend them to the attention of the Council and Members.

I shall begin with the Implement and Machinery list. It has been urged that only certain implements or machinery should be tried at certain meetings; and thus taking them successively, each kind of implement or machine would in due course be put upon its trial, and be tested in a thorough and more careful manner. I had a good opportunity to observe the various trials of implements at the late Lincoln Meeting; and although some of them could not be said to have had all the tests applied of which they were capable, yet, upon the whole, I think the various trials were conducted with great care, and with a tolerably satisfactory result, so far as enabling the judges to decide upon their various merits. It does not satisfy the disappointed candidate; but when experienced men set to work to find out which implement or machine is best adapted for its intended uses, taking into consideration price and simplicity of arrangement, the task is not of such a difficult character as many are led to believe. I trust that after experiencing such a splendid meeting at Lincoln, with such universal approbation, the Council will decidedly object to this proposed alteration. I think, as a whole, the implements and machines selected for competition for the various prizes is judiciously made: some, indeed, might be left out, and others included—such, for instance, No. 6 (a drill) in the Lincoln Prize Lists, adhering to the same principle as laid down for ploughs—"the best for general purposes;" also Nos. 9 and 10, these being all drills, whereas one such implement ought to suffice for all farming purposes of drilling. Draining ploughs and tools, waggons and carts, rollers or clod-crushers, rakes, harness, harrows, hay-making machines, scythes, reaping-hooks, forks, spades, and shovels, and similar small implements, I would give distinctions to mark their merit: these might (with others of small note) be included in the prize-lists, and for which I would give prizes—money prizes—because I believe this stimulant is the most potent with inventors of all grades, and more particularly with those of needy means.

By some it has been further urged that distinctions other than money prizes would be more acceptable to the majority of exhibiters. To many of our wealthy manufacturers, of course, the reception of a few pounds is of no moment; but to very many ingenious artisans of humble means it is a proper encouragement, and I trust it will not be abandoned, if only for their sakes, and to induce the working mechanic to exert his powers of invention for the general good. I altogether approve of other distinctions, and hope the Council will adopt the series of distinctions conferred by medals. I know it was much desired by the judges at the late Lincoln Meeting, and they would have gladly awarded such medals, according to the degrees of merit, had such been in their power; it would have relieved them also from considerable difficulties in cases where the balance of merit was so nearly equal between different implements; but to discard money prizes as distinctive medals is, in my humble opinion, wrong, and would lead to a relaxation of effort in the lower classes of mechanics.

I would suggest to the Council the adoption of medallic distinctions of various orders or grades of merit, and the modification of some of the implement and machine prizes. I would award these medals in succession to the prizes of the various classes of implements, and in proportion to their respective merits, as secondary prizes, giving medals of first, second, and third classes, so as to mark their respective degrees of merit; whereas, upon the present footing, one implement or machine obtains all the fame or note, and the remaining are thrown into the shade. I hope both will be adopted by the Council, and I think it would meet with general approval. It may be said that this would incur great expense, which the funds of the Society are not prepared to meet. To obviate this, I would regulate the money amount of prizes generally, and give more of them. Implement-makers who manufacture valuable implements desire to have them recommended as such, and all that are worthy of such commendation in a high degree should receive a medal, denoting the degree of merit it is considered to have attained; this will be its passport to the agricultural public, and add much to its future sale; whereas, on the other hand, the want of this medal would act as condemnatory to an inferior implement or machine, supposing at all times that the judges are men of judgment and knowledge deserving to be trusted in such an important matter. Their object should be to set before the agricultural world such implements and machinery as may be worthy their notice, and to condemn those likely to be useless or unworthy their notice.

In making a few observations upon the Stock classes, I shall be as brief as possible, being at all times desirous merely to put a subject forward for general consideration rather than discuss it myself. My main endeavour is to extend the benefits of this great Society without trenching too much upon its finances; at the same time I believe that the extension of its usefulness will progressively enhance its funds. I wish to comprise in its prize sheet a greater number of classes. I quite approve of making the three favourite breeds of cattle the most prominent: Short-horns, Herefords, and Devons are the staple or established breeds of this kingdom, and as such should stand first. I wish to save the Society's funds in some cases, and extend them in others. Now, in these classes I cannot see any great good to arise from the exhibition of bull calves any more than in the exhibition of ram lambs. It is also a deviation from the general order of the classes; moreover, as this Society is for the encouragement of good breeding, it might be more advantageous for these animals to be shown at a more mature age, when their proportions are fully developed, and they are old enough to propagate their species: many young animals grow out of shape. I would suggest then that the classes of Bull Calves be omitted, and the fund thus saved appropriated elsewhere, which I will endeavour to point out. I also think that thirty pounds would suffice for the first prize to Bulls in these classes, as in the Horse classes. In the classes of Horses I think we should have a prize for a roadster mare, and a class for hunting horses, mares and foals, geldings and fillies: these are all very valuable in their places, and their breeding deserves every encouragement. In the Sheep classes I would suggest several alterations and additions. Can any one define a true-bred Leicester sheep, or certify to its purity of blood? Leicester sheep are of all sizes, shapes, and features; and yet they are said to be "pure Leicesters." I don't dispute or discredit it; but I should like to know why they are to have an exclusive class, for I cannot tell where these pure Leicesters leave off and the Long-wool begins, or show the distinction. I think the Leicester class should be thrown open to the competition of the smaller breed of Long-wools, which being so nearly assimilated, greatly increased competition would be the result, and much good would be done. As the classes now stand, there is no alternative but to compete with large Long-wools or the Cotswold sheep, which are altogether different in size, shape, and character. The smaller breed of Long-wools is a highly prized and most valuable breed of sheep—second to none in a profitable fleece and readily fatted carcase, and extending over a large extent of country. The Council may rest assured that ultimately something will have to be done for this extensive class of sheep: they must either be allowed to compete in the Leicester classes, or have a separate one set apart for them, and which indeed for the present would be best. I would therefore suggest that a class be formed of *Long-woolled sheep of a small breed, not being Leicesters.* We shall thus have Leicesters, small Long-wools, and Long-wools as before.

In the Short-woolled classes, I would retain the pure Southdown; but I would create another class for other Short-woolled Sheep, in which class every cross of Short-wools might be allowed to compete. The local prizes for the ensuing year will, I presume, embrace the varieties of Mountain Sheep as a separate class.

In the Sheep classes, I would reduce every first prize to 25 sovereigns. The distinction will be sufficient; it is not the amount of money that is the great stimulant to first-class breeders; it is not, as in the humble mechanic's labours; the proud preeminence is what is aspired after in this class.

In the Pig classes, it is very difficult to determine which is of the Large and which is of the Small breed; but as the varieties and sub-varieties of these animals are so great, it would be an endless task to classify them into suitable classes; much must, therefore, be left to the discretion of the stewards and judges. The Council have done wisely in adhering to the distinctive classes—Large and Small breeds.

The only alteration I would suggest in the Poultry classes is to confine every class not to exceed three prizes, and these to be three, two, and one sovereign respectively, in the classes where three prizes are given, and two and one sovereign where only two prizes are given.

The summary of my suggestions, then, stands thus: To withdraw bull calves altogether, and to reduce the rate of premiums given to the first prize animals, and some others, which I will enumerate:—Three first prize bulls (£10 each) £30, three bull calves (£10 each) £30, six first prize sheep (£5 each) £30, poultry, &c., £25, total saving £115.

I would create a Hunting class, prizes to amount to £65; Roadster mare and foal £10. To two new Sheep classes appropriate £150; total £225. The addition then to the prize list of these classes will not incur, on this showing, an extra expenditure beyond £110. I submit these remarks, hoping they may call forth renewed efforts to add to the great usefulness of the Society.

[We should be sorry ourselves to see any of the premiums reduced in amount; but if the list is to be extended, perhaps such a reduction may be a matter of necessity.—ED. F.M.]

ON THE USE OF TOWN SEWAGE AS MANURE.

It has been proposed to deodorize sewage, and to convert it into a solid and portable manure, by means of the salts of zinc and iron. They are excellent deodorizers, and have been extensively used for that purpose, but there their functions end. As deodorizers they act thus: Ammonia and sulphuretted hydrogen are the chief gases given out during the decomposition of animal and vegetable substances, accompanied by certain peculiar odours which distinguish the putrefaction of each kind of substance. Sulphuretted hydrogen is a noxious gas, not to be inhaled with impunity. In pure ammonia, on the contrary, there is nothing disagreeable; but ammoniacal vapours appear to act as carriers of those odours; at all events, the escape of ammonia is intimately connected with the offensive character of such effluvia. The acid of the salts of zinc and iron combine with the ammonia, while the metal of the base decomposes the sulphuretted hydrogen, by combining with its sulphur to form insoluble and inodorous sulphurets. The salts, however, of ammonia, produced by combination with the acid, though not volatile, are soluble; and therefore we gain nothing by the use of salts of iron and zinc, towards the separation of the ammoniacal compounds which are in solution in sewage water.

The two substances proposed for its conversion into solid manure, which Professor Way is disposed to regard with the most favour, are burnt magnesian limestone, and the soluble silica which his researches have brought to light in the freestone or upper-green-sand of a part of Surrey and Hampshire. Of neither, however, though the use of the latter was suggested by himself, does he speak very hopefully.

With regard to magnesian limestone, it is proposed to use it in the burnt state, either alone or mixed with charcoal, as a filter for the sewage, which shall retain the phosphoric acid and ammonia, in their insoluble combination with magnesia.

"I am unwilling," says Professor Way, "to express a decided opinion on this process. Originated by a chemist of ability, it possesses the advantage of correct principle, to which none of the other methods can lay claim. In all those plans which have previously engaged our attention, there is an absence of any effective cause for the retention of the soluble ammoniacal compounds; but in this process the deficiency is theoretically, at all events, supplied: I say theoretically, because there are circumstances which, it is to be feared, will seriously interfere with its success. To mention only one or two: phosphate of ammonia and magnesia is not absolutely an insoluble salt; and it has already been shown, that for every part of ammonia present in sewage, we have to encounter the solvent action of 10,000 parts of water, containing all sorts of other salts. Whether, under these circumstances, the insolubility of the compound produced will be sufficient to preserve it from being washed away is matter of doubt. But, further, this compound will have to encounter the formidable action of that universal solvent, carbonic acid, contained in the sewage. It is true that this may be neutralized by a free use of the magnesian limestone, but not without the attendant disadvantage of introducing into the manure large quantities of useless carbonate of lime, as was before shown in the case of ordinary lime. But, whatever may be the difficulties attending it, this process deserves consideration; and it is much to be wished that it may be worked out successfully."

With regard to the use of soluble silica in the preparation of a solid manure from sewage, the researches of Professor Way have established the existence of certain double silicates of alumina and of another base, which may either be ammonia, potash, soda, magnesia, or lime. They are all to a great degree insoluble in water; and the lime compound is decomposed by salts of all the other alkalies and alkaline earths; so that, by digesting the double silicate of alumina and lime with sulphate of ammonia or sulphate of potash, sulphate of lime remains in solution, while a sparingly-soluble silicate of ammonia or potash is formed. If, therefore, in consequence of the recent discovery of a new source of soluble silica, a *cheap* double silicate of lime and alumina can be manufactured, it might be possible, by means of it, to remove the ammonia and potash of sewage water in the solid state. The same difficulties, however, would attend the use of these salts as in the case of magnesian lime; and, upon the whole, Professor Way considers it very doubtful whether they could be used in this way with any practical advantage. The conclusions to which these researches have led may be summed up thus:

1. By far the largest portion of the fertilizing matters of sewage exist in the liquid form.

2. The solid portion has not even the agricultural value of ordinary excrement, much less of night-soil, as is usually assumed.

3. It is so largely diluted with water, that any attempt to concentrate it must be fruitless.

4. The plans which have been proposed for the production of solid manure from sewage have no other value than that of promoting the separation and filtration of the matter held in suspension, which, as well as the liquid, they deodorize.

5. Charcoal does not retain the ammoniacal or alkaline salts; it merely renders the filtered matter inodorous, and assists in its desiccation. It adds nothing to the value of the manure; but, on the contrary, introduces a large quantity of useless matter.

6. The salts of zinc, alumina, and iron deodorize and coagulate, but nothing more.

7. The salts of magnesia and the compounds of silica, which are really adapted to the separation of the soluble manuring matter in sewage-water in the solid form, may altogether fail of success, in consequence of the extreme dilution of the liquid, and its solvent properties.

To the farmers, then, we would say, When you are offered dry manures which profess to be prepared from sewage on chemical principles, beware! you have had ample warning. If you buy them, and are disappointed, it will be your own fault. "Cheap manures," they are told on high chemical authority, "that is, manures of small value, at an equally small price, are a mistake. Every step we take is in an opposite direction, namely, in the concentration of fertilising qualities; and if in the act of producing sewage manure in the solid state a low per-centage of manuring ingredients is obtained—the great bulk of the manure being useless to vegetation—the result is a failure, not a success, however much of the manure may be obtained."

In these inquiries, Professor Way has not entered on the question whether the entire sewage in the liquid form is capable of being applied economically to agricultural purposes. His object has been rather to guard against what *ought not* to be done than to point out what should be attempted—to check error rather than to propound truth. In addition to the reasons which he assigns for this reserve, it must be remembered that his investigations were undertaken at the instance of the Royal Agricultural Society, where the employment of manure by means of the steam-engine and a system of pipes laid under ground is not looked upon with much favour, but is regarded as too great an innovation on established usages to be worthy the attention of practical men, and as being the mere hobby of a few visionary and enthusiastic sanitary and agricultural reformers. It is easy, however, to see which way his opinions tend, and that he considers the chief impediment to the utilisation of town sewage in this way to consist in the reluctance of farmers and landowners to use it.

PLANTING AND MANAGEMENT OF HEDGES.

The common white-thorn has now been long established as the best tree for the purpose of being reared into hedges, to divide lands into fields or inclosures. It seldom rises to the size of timber; but as a lawn tree, with a canopied top, is very beautiful, in the common white kind and in the variegated sorts. The varieties are several, and are much valued in the secondary landscapes that adjoin a mansion.

A very great recommendation of the white thorn consists in the pertinacious vitality, which defies many common means of destruction; and the property of adaptation to a great variety of soil and climate. The blasts of the sea and the severity of Alpine climates do not annihilate the existence of the thorn. It grows on all soils, from the most barren sands to the clays of the most viscous and obdurate extreme. The growth is sufficiently rapid to carry along with it the necessary constitution, and its aged existence serves well the purpose of a durable standing: the prickles or spinous excrescences being most admirably suited for a fence.

The ripened seed of the thorn in the haw with a stone kernel are gathered in the late autumn, stored over winter on a dry floor, and sown in the spring on finely prepared beds of ground, in a nursery, for the purpose of rearing young trees. The seedling plants of one year old are transplanted into rows, where the growth is nurtured by hoeing and digging the intervals. The following year, the sets are transplanted into wider rows, in which they remain till wanted for use.

It will be well to describe the absurd but common mode of planting hedges still practised by many before stating our own views on the subject.

The almost universal custom raises a mound or dyke of earth, on which, or in which, the young sets of thorn are destined to grow. Even on the tops of hills or mountains, the natural height would not satisfy many, but a mound of additional height must be raised! A large ridge of earth is reared above the thorn sets, which excludes every moisture, and the plants are left to struggle with the scorching drought of the exposure to the rays of the sun, the weeds being very carefully cleared away, to add to the scorching situation by the non-retention of moisture. The dyke or earthern fence is raised in the posterior perpendicular height of 5 to 6 feet, with a sloping ridge over the young sets, which grow at some little distance from the ground. This sloping face of the fence throws off all moisture from the mound, which soon becomes very dry and mouldering. The thorns are cleaned of weeds by means of narrow spades being pushed through between the sets, by which means the earth is yearly worn away, and exposes the roots of the plants. The young trees are cut and mangled into various forms so soon as they can bear the knife, and all with the intention of promoting an undergrowth thickness, or an equality of fence! The very contrary occurs: for protrusions happen wherever an incision is made, and growth is checked by any touch of interference. On sandy and gravelly soils, the face of the dyke or mound moulders away, and exposes the roots of the thorns. This result happens from raising the bed of the plants above the surface of the ground, irreparable evil accruing thereby.

Our mode of planting hedges does not raise a mound or dyke of any kind, but in every case lays the young sets on the surface of the earth. On grass lands, a single turf is inverted, and a straight line formed along the intended range of fence; the turf is sloped backwards, and on the slope are laid the thorn sets at four inches distant, in the strongest plants of the nursery, cut into the proper length; the rootlets cut clean away, and placed with the root-end downwards on the sloped turf. Earth from the front of the line of fence is then dug and placed over the sets, the best in quality next the plants, and the under soil thrown promiscuously over the first digging, and the whole superposition of soil does not exceed a foot of loose heaving together. The thorn sets in the under-end rest on the grassy turf, or nearly so; when the shoots protrude, the rootlets reach and spread upon the decaying grassy turf, which affords a food of all others yet known the most nutritious and lasting. The digging in front of the line of fence will create a hollow place, to mark the existence of the hedge, and in wet grounds to be formed into a ditch, and filled with stones, and covered with turf after the hedge has attained a height. There should be no open ditches in any cultivated grounds, the courses of water always excepted, and the minor streams may be covered.

When hedges are planted on ploughed grounds, a hollow is made and filled with good soil; a front is formed and battered by the spade; a slope is turned backwards, on which the sets are placed, and covered as before. In every case the thorns grow on the ground; and not upon a raised mound of earth, to be dried and mouldered. On sandy soils the hedge must be placed in a hollow artificially made to hold moisture, and to protect from drought. The soil thrown over the young sets, lies loosely in order to receive and pass moisture downwards to the roots, and in a depth just sufficient to prevent drought penetrating to the young growths. On this back of earth a fence of railing of sawn bars is placed, in height and distance from the thorns to protect them effectually from being damaged by animals; and a similar fence is fixed along the front of the new hedge.

The management of growing, and of matured hedges, is very simple. The weeds are pulled by hand from the young thorns so as to give room to grow, for the first two or three years, till the trees rise, and overcome the weeds, when any interference is not required; no spade or moving of the earth is allowed, as weeds are useful in retaining moisture and defending drought. Any very high shoots or lateral growths may be cut, in order to preserve uniformity; but no general cutting is allowed to deface the natural progression. In this way the hedge grows to the full height of six to eight feet, and if a rich soil, pushes to more height; the trees can be cut to any permanent height, and made straight in front by switching the branches. A moderated uniformity of nature's profusion is more pleasant to behold than the sameness made by the shears of a gardener, or any form produced by the cutting knives. This mode does not cut, splay, plash, or mangle hedges in any way; it rears thorns to the full stature, where the fence remains till nature is exhausted. The rail fences endure till the hedge is beyond the need of protection; the thorns growing on the surface occupy little room, and the covering in of all ditches wastes no ground unnecessarily. The cost is small comparatively, and attains an effectual purpose in an easy way.

THE MANAGEMENT OF SHEEP IN HEALTH AND DISEASE.

SIR,—In taking a retrospect of the different seasons, winter is that in which all nature desires to repose. The subjects which now court attention are of the most interesting (as well as important) character to the farmer. Finding little inducement to spend much time in the fields at this torpid season of the year, he directs his attention to the more animated work conducted in the steading, where the cattle and horses are collected; and, as the progress of live stock to maturity ought always to be a prominent object in the farmer's solicitude, it is my intention to say a few words upon the inadequate judgment of the shepherd or cattle-man, as well as the neglect of the farmer. The feeding of sheep on turnips in the field in winter forms fully as interesting an object to the farmer as the storing of cattle, inasmuch as their behaviour, under every circumstance, is attractive.

The first part of our business is the selection of the store-stock, which the farmer generally procures at some of the autumnal fairs or neighbouring markets; some farmers preferring one kind or breed, other farmers another breed; but I prefer the half-breds between the Down and Leicester. Of course, it depends upon whether the selection is made with judicious and cautious admixture. A good cross between the Leicester and Down will come to maturity quicker, or, in other words, it will realise more weight in a given time; from twenty to twenty-two months being the period it will take to produce 10 stone of mutton and from 7 to 9lbs. of first-rate wool (but it depends upon the keep: mind, I do not mean here that to keep them badly they will do this), under a cautious and judicious management.

The first consideration with a judicious farmer, after purchasing his store stock, is to have the shepherd or cattle-keeper inspect them from head to foot, and he will invariably find some of them lame, or infected with ticks and lice, which he will readily observe by their rubbing themselves against everything they come near. The shepherd will easily see which are most affected: those which are *lowest in condition* are sure to be the *worst*. He should lose no time in dressing them, and the farmer should see they are carefully done, as it is impossible for them to thrive while they are incessantly tormented. The usual drugs resorted to in this case are tobacco, mercurial ointment, and arsenic; but I think there's nothing more simple and efficacious than Bigg's sheep dipping composition, which I believe is had recourse to by most agriculturists, not only for the destruction of tick and lice, but for its protection against the attacks of fly, which we all know to be so very prevalent in wooded districts. Caution should be used in dipping them, and great care must be taken that none of the liquid enter the mouth, nose, and ears; but the shepherd will have directions sent with the composition.

Having passed over the lice, the shepherd may find some of them lame, from driving home, which the composition will tend to heal in the feet, by their being allowed to stand in the dipping tubs with the liquor about six inches deep for the space of five minutes; and little trouble will be witnessed unless it should turn out to be the foot-rot. The usual symptoms are—the feet will be found hot and tender, the horn softer than usual; and there will be an enlargement about the coronet and a slight separation from it, ulcers being formed below, with a discharge of thin fœtid matter.

The ulceration of foot-rot will not long exist without some other annoyance or constitutional disturbance: when at length the powers of nature fail, and the animal dies from irritation and want. 'Tis true, the shepherds will say to their masters, "Oh, I can cure it." But I maintain that there is not one shepherd in twenty who can cure the foot-rot. They may stop it for a time. I never saw one go the right way to work to effect a cure. I will therefore state the proper way to proceed.

First, then, cut the horn away, and clean off all the pus (matter); wash the feet well with soap-and-water, and rinse them with plain water; after drying a little, wash again with a solution of chloride of lime, in proportion of half a pound of powdered chloride to two quarts of water. This will remove the fœtor and tendency to mortification. The muriate or butter of antimony must be resorted to, by means of a feather applied to every denuded part. There is no application equal to this, in my opinion, and it readily combines with fluids, and becomes diluted. Little or no harm can be derived from it, so far as these foot cases are concerned. It supersedes every other application. The foot should be dressed every day.

Having passed by the two maladies, lice and foot-rot, we come now to the general keep of the animal.

The store sheep should never be allowed to get into worse condition than they generally are in when bought at the fairs or markets, which is too frequently the case, but kept on such food as will tend to improve them. True it is that hundreds of farmers keep their stock in such condition as to cause disgust to the passers-by, bringing on disease, to the annoyance of himself and nuisance to his neighbours, amongst which is that well-known disease—scab, which is entirely brought on from bad keep. From such an infectious, troublesome, and destructive malady a sheep is never even slightly affected but it proceeds to rub itself against everything it meets. As soon as the disease is discovered, it becomes the duty of the shepherd to examine every animal in his charge, and remove every affected one from his flock, and dress it with an ointment composed of — corrosive sublimate, 1 oz.; white hellebore, in powder, 1½ oz.; whale or other oil, 3 quarts; rosin, 4 oz.; tallow, 2 oz. The sublimate must be reduced to a fine powder, and mixed with a portion of oil, and also the hellebore powder; the rosin, tallow, and remains of the oil may be melted together, the other ingredients then added and well mixed. Should the compound be too thin, the oil may be diminished and the tallow increased. Some little attention being paid to the animals, they will in a short time recover; but, as a preventive, in my opinion, is better than a cure, to ward off the disease there is the only good and profitable defence—*keep* your flocks in good condition by abundance of good and wholesome food.* Should the shepherd, after he has examined them, find no scab, he may then turn them into some pasture.

It is the prevailing practice among some of our Essex farmers, although not among the judicious ones, to save their etches (as they term it) to grow feed. *Poor judgment!* and it is my humble opinion that, if it does not pay to grow good and wholesome food for your stock, it does not pay to grow weeds for the sake of feed, which, according to analytical composition, is much inferior. Some farmers will tell you that *tare* grass is a capital thing; but don't you think that good sweet grass, with all those compounds which form nutriment contained in it, is better than the refuse of that grass after it is spent and gone, and the grass is dead for want of them? They may say it keeps the stock from scouring; but I say it does them no harm to scour at that time of the year, and they will thrive better and faster after it with the addition of *the said new grass*; and, supposing they do not, then is not a little sweet hay better than old useless tare grass?

In turning back to the policy of letting your etches grow for feed, it is my plan to plough the land directly after harvest, to eradicate the weeds, not to encourage their growth. Some have the poor excuse to say, We should not have feed enough. Then I would tell them, Grow, or rather sow, some in the spring ready for the autumn; if you can't do that, then don't keep stock to breed disease, to the disgrace and loss of yourselves and annoyance of your more scientific neighbours. It cannot but be reasonable to suppose that it is a scientific man's pleasure, as well as judgment for his gain, to grow plenty of good wholesome food for his stock. If every farmer, upon an average, would grow from 12 to 20 acres of root crops to every 100 acres of land he holds, he would invariably find plenty of good wholesome food for his stock, without letting his land lie dormant in a manner, to grow feed. When I speak of 100 acres, I include the pasture land in the 100 acres so reckoned—that is, from 12 to 20 acres of roots and coleseed, exclusive of grass, unless the grass land is out of proportion to the arable. Then, by a little calculation, a judicious farmer will be able to order his arrangements.

Having now passed the autumnal season, we shall find it time—for want of better provender, and as the period will be fast approaching to get rid of the summer-grown coleseed from off the land (sheep or lambs should always begin upon coleseed, as it prepares them for the turnips, besides being more digestible for young sheep)—to come to that part of the business of stock farming called folding sheep. There are various ways of folding: some turn the sheep on the turnips, and let them eat them level to the ground; but, as I before mentioned that coleseed is best for sheep to begin upon, as it prepares them for turnips, they in no wise ought to be turned upon the folds or breaks when empty, as they would be sure to be taken with the hoove, commonly called *blown*. Now comes the time for the shepherd to practise his skill to perfect a cure. Some of the older shepherds used to send a dog amongst the sheep to drive them about, thinking it would cure them; but no such thing. I am happy to say the intellectual powers of the shepherds have been, to some little degree, awakened to such barbarous means. Some of them would thrust a knife, or some such instrument, into the stomach, to let the wind out, as they term it; but even this practice is a dangerous experiment, and should be adopted only in cases of *necessity*, unless by some one who is well versed in the anatomical structure of the animal, which a very few, or I should not be going too far were I to say none of the self-taught shepherds are acquainted with. The most effectual method of curing all diseases is, first to ascertain the primary cause of such disease, or, in other words, from what the disease first arose. Hoove or blown then arises from a gas generated from the food being sometimes eaten too fast, sometimes merely from *indigestion*. Now, that gas is called by chemists, "hydrogen;" but mostly a mixture of carbon and hydrogen, called "carburetted hydrogen." It becomes, then, a consideration of importance, whether there be no means of getting rid of this gas already developed, as well as to prevent the future generation of gas. I have previously said that the gas which is developed is a compound of hydrogen and carbon. Now, there being a very strong affinity between chlorine and hydrogen, and as *they* rapidly combine when brought into contact with each other, if a small quantity of chloride of lime, a *drachm* dissolved in a quarter of a pint of water, be introduced into the stomach of a hoven sheep by means of a horn, or, what is still better, by means of a bottle *for this purpose*, the chlorine will leave the lime and unite with the hydrogen and muriatic acid, a compound of hydrogen and chlorine being formed; after this, the muriatic acid thus formed will unite with the lime liberated from the chlorine, and a harmless compound—*muriate of lime*—will be the result. It frequently happens that when stock of any kind have had an attack, they are almost sure to have a second: to guard against this, the farmer should have a purgative administered. The best medicine in this case he will find is, Epsom salts, 2 to 4 oz., with a drachm of ginger. The food should likewise be limited for a few days, *and do not* by any means, as is too frequently *the* practice with some conceited shepherds, turn them on the food upon which they were blown, but turn them on some bare pasture for two or three days, and gradually give them the food, so that their stomachs may get used to it again before they are turned on the fold or break.

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* Could the Government be prevailed upon to boil the damaged tobacco, instead of burning and wasting it, and sell the extract at a moderate price, the revenue would gain considerably by it, and a boon would thereby be conferred on store farmers, and likewise on gardeners.

We have here seen the causes of hoove or blown, and we have likewise given a sure and safe remedy, if practised with any judgment at all. We come now to the *still* more profitable means of preventing this malady as well as the less risk. When the time arrives to put the lambs on coleseed, be sure to let them have their fill of grass or some dry food as well—1 or even ½ lb. of oil-cake, it being an oily nature, neutralizes any acidity which may arise in the stomach; and, indeed, in many instances, ¼ to ½ a pint of linseed oil might cure; but not so certain as the remedy before given, although it may neutralize any acidity, and help to ward off the hoove as well as to support the animal in a healthy and vigorous growth.

The lambs or sheep should not be turned on the breaks or folds, even after having their fill of hay and cake, for more than an hour or two at a time, and then turned into the yard to chew their cud and rest, thereby giving them time to digest what they have already eaten. It may be well here to state that in a very cheap and comfortable yard by a haulm wall and portable shed in the field, the sheep will lie warm; and as it is well known that sheep do not eat in dark nights, they will be more comfortable; and I have myself found that the sheep do better on a less quantity of food: it helps to keep them in health, and I have no hesitation in saying the wool is of much better quality, and in a greater proportion than if they had been subject to all weathers. Hurdles may be put round the yard, as it will form the cribs to put the hay in. In the morning the troughs should be cleaned out, then give the sheep ½ lb. of oil-cake: if you intend to fatten them, 1 lb. will not be too much, when on turnips. After the sheep have eaten their oil-cake, they may be turned on the fold, and no injury, in nine cases out of ten, will happen to them. In this way, and upon coleseed, the sheep may remain for a fortnight or three weeks; by that time the turnips will be ready. Many farmers put their sheep on turnips (swedes) too early—namely, before they are ripe. I have often known sheep die on swede turnips when first put on, when it could not be seen what ailed them, and I believe it is nothing else. The turnips should be cut. I have found one of Gardner's cutters the best for this operation. It is a matter of impossibility for the young sheep to eat the turnips without being cut: I am certain that they will not thrive so quickly, and I consider that one part out of three of the turnips is lost. There is this difference in cutting turnips and not cutting them: Suppose you put 100 sheep on turnips not cut and 1 lb. of oil-cake, they will not do so well as 100 sheep put on turnips cut for them without any cake, neither will they be fit for the butcher so soon by two months. Let any one try it: they will find my remarks upon this matter quite true. After the sheep have been on turnips till the latter part of February, it is my plan to remove them to some pasture, and there receive turnips till the latter part of March. I then give them mangel wurzel, which is just about getting good; and I find the sheep at that time of the year do better upon mangel wurzel. I keep them on the pasture, so that they may enrich it till tares come in. I then fold them on tares; at the same time give them oil-cake and mangel till white clover is a good bite. After they have been on white clover a week, I have them shorn, as they thrive much better at that time of the year. In about three weeks or a month I find they are fit for the butcher, which will be about nine months from the time purchased; and I have no hesitation in saying, that sheep under this treatment will thrive, and turn themselves in nine months better than others in the ordinary way will in twelve months. It then becomes the business of the farmer to select other lots to finish his white clover; and by this means he will find that he will turn three lots to other farmers' two lots.

Who, then, under the present crisis, would not practise it? There is now no protection; then let your judgment, and the profits arising from that judgment, be your protection. F. C.

Sutton.

DECIMAL DIVISION OF WEIGHTS AND MEASURES.

The question of a decimal coinage advances as slowly as the most inveterate "slow-coach" could desire. In this, as in all the great questions of social progress, the *far niente* system shelters itself under the specious garb of prudent and salutary caution. Truly, we have need of some statesman who will cut boldly, and sever the whetstone with the razor. A decimal coinage, however, would have comparatively little value, unless accompanied by a decimal division of weights and measures; such an arrangement, for instance, as that which would make the hundred-weight a *bonâ fide* 100lbs. instead of 112lbs., the stone 10lbs. instead of 14lbs., and the ounce the tenth part of the pound avoirdupois. In England we have still too much confusion arising from the employment of local weights and measures, although it is not so great as it was a few years ago. This confusion, however, is order itself, compared with the chaos which prevails in Ireland, and which constitutes no slight embarrassment to the English farmer who settles in that country. In the first place, there is the Irish acre, by which land continues to be too generally let; while the public valuations for the county cess and the poor-rate are in statute acres. The English acre is to the Irish acre as 121 to 196; and the difference arises from the difference in the respective linear perches, that by which the statute acre is measured being 5½ yards, while the Irish linear perch is 7 yards.

Corn, again, is sold by the stone, the cwt., and the barrel. The stone and hundred-weight always consist of 14lbs. and 112lbs. respectively; but the barrel varies in almost every town, and it varies in the same district for the different kinds of grain. At Roscrea and Nenagh a barrel of oats is 12 st.; at Limerick, Cork, and Dublin, it is 14 st.; at Newton Limavady, 18 st.; at Sligo, 24 st.; at Killarney, 32 st.; at Skibbereen and Bandon, 33 st. A barrel of wheat is everywhere 20 st.; a barrel of barley is 16 st., except at Newton Limavady, which appears to delight in anomalous weights and measures, and where the barrel is 24 st. Potatoes are purchased in some places by the stone of 14lbs., in others by the stone of 16lbs. In some places they are sold by "weight" of 21lbs., and in others by the barrel, which varies through 15, 20, 21, 24, 32, 40, 64, 72, 80, 95, 96 stone of 14lbs. They are also sold by the cwt. of 112lbs. A pound of butter consists in some towns of 16, in others of 18 oz.

A stone of flax is in some markets 16lbs., in others 14lbs. A hundred weight of flax consists, in different localities, of 112, 120, and 124lbs. Pork is purchased through all the north of Ireland by the long hundred of 120lbs., in the south by the short hundred of 112lbs.

The above statements rest on the authority of the Commissioners appointed to inquire into the state of fairs and markets in Ireland, who add, that the weights frequently vary completely in markets only a few miles from each other, and that the diversity over the whole country is so great, that a person seeing a list of the prices of produce in the principal markets of Ireland would derive but little information, unless he were personally acquainted with the particular usage of each locality. They describe intelligent persons examined by them, of all classes and in all parts of the country, as of but one opinion as to the injury inflicted on its industrial interests by this infinite diversity of weights and measures, by the difficult and obscure calculations which they render necessary, the fraud and deceit which they encourage, and the uncertainty which they introduce into all agricultural and commercial undertakings.

At present all the poorer classes, in consequence of the complicated nature of the existing system, are in many cases quite ignorant of the amount which they are to receive for the produce which they sell. In the article of pork, for instance, one of the staples of Irish agriculture, it would be difficult to devise a more confusing mode of buying a pig—a process which even well-educated persons are frequently unable to understand. Pork is purchased by the cwt. of 120lbs., but is weighed by the cwt. of 112lbs., and a ticket is given for the weight accordingly. The purchaser then converts the short cwts. into long, and deducts the beamage or tret from the weight, together with an allowance in money for porterage, and calculates the price of the odd pounds less than ¼ of cwt. at the next lowest even price. The farmers unable to follow these intricate calculations, are in general quite ignorant as to whether they are paid the proper amount or not, and are obliged either to trust implicitly to the buyer, or else to employ some shopkeeper or other person to check the ticket for them. In one large pork market a schoolboy who was a good accountant obtained a living by doing this, in consideration of a small sum paid him by the farmers on each pig!

It is not to be wondered at that the commissioners found the necessity for a general assimilation of weights and measures very extensively admitted and pressed upon them during the course of their inquiry. Two plans were recommended. The first was the abolition of all local and provincial usages, and the enforcement of the imperial standard of cwts. and qrs. in all transactions; the second, the adoption of a decimal system of weights and measures. They consider the first a move in the right direction; but urge very justly that it would cause as much temporary inconvenience as the introduction of the sounder and more perfect decimal system, which affords such obvious facilities for calculation, and for the detection of frauds. They consider that a scale proceeding by decimal multiples of the present pound avoirdupois would cause the least deviation from established customs. In this opinion we fully concur; and should consider such a change, accompanied by a decimal division of the pound sterling, a great gain to all classes in England. The anomalies which pervade our present divisions of money, weights, and measures would appear to have been purposely devised for the benefit of the authors and publishers of books of arithmetic, as well as to exercise the patience and memories of school-boys, and to prolong the period of their education by the time expended in learning tables, and in reducing them to practice in compound addition, multiplication, and division, to say nothing of practice and the rule-of-three.

Ireland, according to the commissioners, offers one facility for the change, which we do not enjoy in England. It is this: that it would rarely be necessary for the farmers to purchase new weights: the poorer and smaller occupiers, who constitute the majority, rarely possess weights and scales of their own. In many districts the owners of that useful species of property are in the low ratio of one to two hundred.

It will be observed that Lord Berners, in his speech at the Farmer's Club dinner, on Thursday, especially referred to the necessity of some such improvements as we have here advised.

LONDON, OR CENTRAL FARMERS' CLUB.

THE RESULTS ARRIVED AT FROM THE SEVERAL SYSTEMS OF DRAINAGE IN PRACTICE DURING THE LAST FEW YEARS.

The usual monthly meeting was held on Tuesday evening, Dec. 5, at the Club House, Blackfriars; Mr. Pain, of Felmersham, in the chair. The subject for discussion, introduced by Mr. J. B. Denton, of Gravely, Herts, was—"The results arrived at from the several systems of drainage in practice during the last few years." There was an unusually large attendance of members.

The **Chairman**, in opening the proceedings, said they must all agree with him that the subject put down on the card was one of the greatest importance to British agriculture. Among the large and influential body of farmers whom he saw before him, there were no doubt many who, like himself, had had some experience with regard to drainage, both as it affected the land, and as it concerned their own pockets; and as several of them probably wished to have an opportunity of expressing their views on the subject, he must, in the exercise of his authority as chairman, limit each speaker to a quarter of an hour.

Mr. J. B. **Denton** then proceeded to introduce the subject in a long and elaborate paper, of which our space will admit only of a summary. He commenced by observing, that although no subject connected with agriculture had been more frequently discussed than that of land-drainage, nothing could more tend to the general benefit of the country than a clear exposition of the results of the experience of the last few years. He had been connected with drainage sufficiently long to be a witness of the complete overthrow of several opinions which had prevailed for a time; and every day's experience proved to him that there was much yet to be learnt. Those who practised an art upon which there was so much controversy as in drainage, frequently adopted too decisive terms in advancing their own opinions, and in opposing those of others. He felt himself so likely to be guilty of this fault, that he desired to ask to be excused before he committed the error. Reverting back to the year 1846, in which the first act authorizing the advance of public money for the improvement of land by drainage was passed, they found all recorded opinions, of any worth—except those of Elkington, which had reference to spring drainage—to merge into the views advocated by either Smith of Deanston, the first acknowledged advocate of systematic drainage, or by Josiah Parkes, whose philosophical publications on the same subject gave a scientific bearing to it quite irreconcilable with the more mechanical rules laid down by Smith. The characteristic views of Smith were—

> 1st. Frequent drains at close intervals of from 10 to 24 feet. 2nd. Shallow depth—not exceeding 30 inches—designed for the single purpose of freeing the depth of soil of stagnant and injurious water. 3rd. 'Parallel drains at regular distances, carried throughout the whole field, without reference to the wet and dry appearance of portions of the field,' in order 'to provide frequent opportunities for the water rising from below and falling on the surface to pass freely and completely off.' 4th. The minor drains to be directed 'down the steep,' and the mains to be directed along the bottom of the chief hollow, with tributary mains for the lesser hollows. (The reason assigned for the minor drains following the line of steepest descent was, that 'the stratifications generally lies in sheets at an angle to the surface.') 5th. 'Stones preferred to tiles and pipes.'

The characteristic views of Parkes were—

> 1st. Less frequent drains, at intervals varying from 21 to 50 feet, with preference for wide intervals. 2nd. Deeper drains at a minimum depth of four feet, designed with the twofold object of not only freeing the active soil of stagnant and injurious water, but of converting the water falling on the surface into an agent for fertilising; no drainage being deemed efficient that did not remove both the water falling on the surface and 'keep down the subterranean water at a depth exceeding the power of capillary attraction to elevate it too near the surface.' 3rd. Parallel arrangement of drains, as advocated by Smith of Deanston. 4th. The advantage of increased depth put forth as compensating for any disadvantages attending increased width between the drains. 5th. Pipes of an inch bore the 'best known conduit' for the parallel drains. (See Evidence before Lords' Committee on Entailed Estates, 1845, Q. 67.) 6th. The cost of draining uniform clays should not exceed £3 per acre. (See Evidence before Lords' Committe, 1845, Q. 151 and 152.)

The practices of the past affording to the Inclosure Commissioners no satisfactory precedents to guide them, and it being necessary to lay down some rules to regulate the expenditure of public money, they were bound to select such as appeared to them best calculated to secure permanent and economical work. Mr. Smith's, or the shallow system, aiming only at getting rid of the enemy, was most popular in the country, because the object was simple, and it more nearly approximated to past practices. Mr. Parkes's, or the deeper system, on the contrary, aiming at the conversion of the enemy into a friend, was only acknowledged in the first instance by the few whom his essay converted into friends. The commissioners recommended for adoption the main principle of Mr. Parkes's system—increased depth; and without pledging themselves to the details, left much to the good sense of landowners, the judgment of their inspectors, and the general progress of knowledge on the subject. In the desire for economy subsequently evinced, soils that should have been drained from 18 to 25 feet apart had been drained at from 30 to 45 feet; and yet the average actual cost of parallel drainage executed in Great Britain, within the last eight years, was three times the amount which Mr. Parkes, in 1846, estimated as that which might be taken as a guide to the future cost of drainage in this country. The money expended in drainage works in England, Scotland, and Wales, under the auspices of the Enclosure Commissioners, amounted at that moment to £2,300,000; and he was speaking pretty closely to the truth when he stated that the average cost per acre was above £5. The points which he should present in treating the subject were four in number—depth of drains, distance between drains, arrangement of system, and direction of drains. As to depth of drains, the character of the evidence he had collected was so condemnatory of the shallow system, and, with one exception only, so much in favour of the deep system, that he considered the superiority of the latter incontestably admitted. In fact, he had failed altogether to gain evidence detracting from the utility of deep draining, as compared with shallow. Cases without number might be quoted, in which an indiscreet desire to economize had led to the recognition of the theory that depth would compensate for distance, in soils to which it would not apply. Mr. George Beaumont, jun., of Bridgeford Hill, wrote, "I have had painful experience that no extra depth will compensate for too great distance between the parallel drains. I have seen drainage well executed, on strong land, fail miserably, because it was drained thirty and thirty-six feet, when at twenty-four feet apart the drainage would be effective." Mr. Gow, of Morpeth, said, "I have had one or two failures in deep draining, where, from a desire to economize, I have placed the minor drains at too great a distance apart; and I find, too, that some of our earlier performances, at a depth of three feet, will require to be redrained at a greater depth." There were abundant instances of deep drains taking the place of shallow ones, and effectively draining land not hitherto drained, although excoriated with shallow drains; while it was difficult, if not impossible, to name a single case where deep drainage, properly executed, and on a good system of arrangement, had failed. So numerous, indeed, were the instances throughout Great Britain of the complete success of deep draining as a principle, that one could hardly bring one's mind to the expediency of a compromise of that principle under any circumstances whatever. When deep drainage was spoken of as a principle, it was to be regarded not only as a means of discharging surplus water, but as a means of rendering active, and suitable for vegetation, a greater depth and quantity of soil than was attainable by shallow drainage. No one could deny the superior capabilities of a greater depth of active soil compared with a less: no one denied that water, in percolating the soil, was a benefit, and not an evil to vegetation. But there appeared to exist considerable doubt whether four-feet drainage was sufficiently deep to prevent evaporation from the surface of the denser clays, doubt arising from the continuance of those clays to crack after drainage at moderate intervals. On this subject the late Sir Robert Peel said, addressing the writer of the *Quarterly Review*—"I can conceive a case in which, if you had a limited sum to expend (say £4 per acre), the nature of the ground might be such that the increased looseness might compensate for increased depth. I mean, for instance, that drains eighteen feet apart and three feet deep might be more effectual than drains twenty-five feet apart and four feet deep. It is utterly untrue that I am dissatisfied with the experiment of deep drainage." They all knew that there were thousands of acres lying on the lias, Oxford, Kimmeridge, and London clays, of which the present rent, in their undrained state, did not exceed 10s. to 16s. per acre, and which to be drained perfectly, with reference to climate as well as soil, would require the drains to be placed from eighteen to twenty-four feet apart. He could well understand a doubt in the minds of deep-draining men as to the expediency of going to the full depth in such soils. The way, however, to understand the question clearly, was to compare cost; irrespective of which, there appeared to be no hesitation in adopting the greater depth. He would take the case of land on the Oxford clay, which he assumed would not support an outlay exceeding £5 per acre, which was equal to 7s. per acre charge for a twenty-two years' term, and compare the cost of draining it by a parallel system of twenty-seven feet intervals four feet deep, with the cost of twenty-one feet intervals three feet deep, assuming the cost of the four feet work to be 6½d. per rod, the cost of the three feet 4d. per rod, and the price of pipes for minor drains 18s. per thousand—

	27 × 4.		21 × 3.
	£ s. d.		£ s. d.
Cutting and filling	2 13 0	..	2 1 10
Pipes	1 10 6	..	1 19 2
Haulage	0 4 3	..	0 5 5
Pipe-laying and extra for mains, clearing out-falls, iron outlets and masonry	0 11 8	..	0 13 0
Total	£4 19 5	..	£4 19 5

A gain of two yards in nine was considerably in favour of a rapid discharge of the water of drainage; but in gaining this advantage they lost the extra foot of active soil which belonged to the four-feet work. The cost of draining four feet deep at the narrow intervals, taking the same scale of prices, would be £6 6s. 8d.; but this proposition, though the right one, was £1 6s. 8d. more than it was assumed was a proper sum to expend, and it was therefore beyond the present question, which was limited to the simple comparison of effect to be produced by a given outlay. There was a conviction amongst practical men, who fully appreciated the benefit of deep drains, that they might be too deep as well as too shallow. In their present ignorance of the state of the earth at various depths from the surface, and of the influences at work beneath to produce changes of condition, it appeared the height of presumption to say that drainage could not physically be too deep. Not only was the force of gravitation powerless on clays beyond a certain depth, but they found that in the adits of coal mines the floors rose as well as sank, showing that there was a pressure from beneath as well as from above, of which they could not estimate the power. There existed a strong feeling with many intelligent men that low meadow land should be treated differently to upland pasture, and upland pasture differently to arable land. The description of meadow land to which he particularly referred was that which had a free and porous subsoil. Among those who treated pasture differently from arable land were the following gentlemen, who had drained extensively in the north of England: Mr. Thomas Anderson, of Little Harle Tower; Mr. Stratton, Spinneymoor House, Durham; Mr. Gow, Morpeth; Capt. Coulson, Newborough; Sir W. Lawson; and the Hon. G. F. Russell. His own observations brought him to the conclusion that it was not possible to lay pasture land too dry; for he had invariably remarked—and in the recent dry summer and autumn particularly—that both in low-land meadows and upland pastures those lands which had been most thoroughly drained by deep and frequent drains were those which had preserved the freshest and most profitable herbage. There was a method getting into practice which would meet the requirements of those who desired to prolong through the autumnal months the growth of their meadow grass, without encouraging a greater vegetation, and without any compromise of the principle of depth; he referred to the use of the drains which were primarily intended for freeing the soil from injurious water during winter, spring, and early summer, for the secondary purpose of sub-irrigating the soil during the latter end of summer and autumn, by letting water pass through the drains from a higher level into the soil, or, by plugging the outlets, contriving to retain whatever water would rise up within it, and which would otherwise be discharged by the drains. He submitted that upon the first point—*depth*—the practice of the last few years had confirmed the soundness of the principle of a minimum depth of four feet, where outfalls would admit of it. The next point was distance. The indiscriminate adoption of the theory that the deeper the drains the wider might be the intervals between them, had brought more discredit on systematic draining than the adoption of any other rule for the furtherance of economy; and the unsatisfactory results which had followed had increased the earnestness of the few who still advocated a shallower minimum depth than four feet. Lord Wharncliffe, Lord Fortescue, and other landowners, had adopted the mixed system of deep and shallow drains as an amendment of the excessively wide system; but this method was so clearly one of expediency, that it could never be recognized as a system worthy to supersede an adequately and uniformly deep system, however it might be justified as an amendment of an unduly wide one. When they found the same width and depth adopted in the drainage of clays of different properties, and the same rule applied to clays of the same formations and properties, in localities differing in the depth of rain-fall and in the duration of wet weather, such as the lias clay of the east coast of Yorkshire, and the same clay of the south coast of Devon, the coincidences implied inconsistency, if not worse. They found, from sundry careful records, that 141 inches might be taken as the annual average rain-fall of the wettest districts of the north-west of England, while 19½ might be taken as the average fall of the south-eastern district. In a table of analyses which he had prepared with a view to ascertain the comparative draining qualities of the characteristic clays of different strata, he had given an analysis of the stiffest red sandstone clay he had met with, which showed that, independent of position, it was as forbidding a clay as any surface-clay they had in England. The result of experience showed that a consideration of the amount of rain-fall was a matter of much moment in determining the width between drains. It did not appear practically to govern the size of the pipes to be used; for if the ends of the pipes could be made to join securely, and the fall were good, the smallest-sized pipes would be sufficiently large. But in proportion to the rain-fall, all other considerations being equal, should be the distance of the drains apart, in order that the condition of the soil might be sufficiently free and active at all times to absorb and discharge the maximum amount that could fall on its surface. Regard must be had to the continuance of humidity in the atmosphere. In the extreme western counties, humidity did not result from the quantity of rain that fell, but from the amount of evaporation arising from the sea, which settled upon the land during the cooler hours of the night in sufficient quantity to keep it moist. This did not apply in the same degree to the north and north-west of England; and the difference went far to explain how success might result in the one case, and failure in the other, if the treatment were similar. He submitted upon the second point—*distance between drains*—that the results of the practice of the last few years had confirmed the principle that depth might govern distance in soils of an uniformly open and porous nature; that in the denser clay soils the compensating principle was inadmissible, and that much clay land had been drained imperfectly from being drained too widely; and that in lands suffering from springs, or from a pressure of water, where each drain should be designed for a special service, there was no dependence of one drain upon another, and therefore no rule of distance whatever could apply. He now came to the arrangement of drains. Mr. Smith advocated parallel drains at regular distances, for the following reasons, given in his own words: "The drains should be parallel with each other, and at regular distances, and should be carried throughout the whole field, without regard to the wet and dry appearance of portions of the field; the principle of this system being the providing of frequent opportunities for the water rising from below, or falling on the surface, to pass freely and completely off." Mr. Smith called this "the frequent drain system." For distinction's sake he (Mr. Denton) had ventured to christen this mechanical practice "the gridiron system." Mr. Parkes adopted the parallel system (with the bars in the gridiron widened), adding that it was the subterranean water, to which excessive and injurious wetness was attributable; and if such water were not removed, and kept down at a depth exceeding the power of capillary attraction to elevate it too near the surface, no drainage could be efficient. It was daily becoming more and more apparent, that to lay out parallel equidistant drains, to discharge all waters rising up, or oozing imperceptibly through the earth, was almost as costly a generalism as Mr. Smith's notion of draining a field, with variety of soil, at regular intervals throughout; for in both cases there must either be throwing away of money in places where drains were not wanted, or the too scanty and inappropriate treatment of places where they were wanted. A consideration of the varying inclinations of surface, of which instances would occur in the same field, necessitated a departure from uniformity, not in direction only, but in intervals between drains. If they were to profit by experience, they would be led to modify the parallel system of arrangement by a closer attention to variation in the texture of the soil, and in the inclination of the surface. He would submit upon the third point—*arrangement of drains*—that the result of the practices of the last few years had shown that, while the principle of parallel equidistant uniformity was applicable where there existed uniform texture of soil and uniform inclination of surface, it required modification directly the soil varied and the surface became irregular; and that the desire for uniformity had led to waste of money and imperfect work. He now came to the last point, the direction of drains—a matter which would almost appear decided so far as the minor drains went, if one might judge by the general adoption of the line of greatest descent, though frequently modified by following the furrows when they were straight, or nearly so, instead of crossing the ridges, in strict conformity with the parallel equidistant arrangement. As there were no rules without an exception, so they found Lord Berners, at Keythorpe, crossing the fall; and in the greywacke districts of the West of England, where the strict parallel arrangement was inapplicable, they found that the subordinate drains, from four to eight feet deep, were frequently laid out at right-angles to the stratification, and sometimes inclined diagonally, so as to intersect the substratum, and it was stated, on competent authority, with good effect. There was reason to believe that well-selected drains, led directly up the fall, would, in both instances, do the work as effectively and economically; but they must hesitate to express a decided opinion contrary to successful practice. In grass lands in the midland districts the furrows were generally preferred by the most successful drainers; while in arable land of like character the practice with the majority was to disregard them. In Northumberland and in Scotland the more frequent plan was to disregard them both in pasture and arable; but, then, it must be remembered that the lands of the north were much more porous than the high-backed lands of Northamptonshire, Huntingdonshire, Bedfordshire, and Oxfordshire. Having tested the efficacy of furrow-draining compared with straight line equidistant-draining, in the Oxford clay, he found that in grass land much less water would rise and stand in the test-holes dug intermediate between the furrows than between the drains crossing the ridges; and during four years' observation he had been unable to detect any difference between the two, either in the quantity or quality of the herbage. In heavy grass lands, if from the position of the lands in relation to the homestead there was no probability of their being broken up, made flat, and laid down again, experience seemed to favour the adoption of drainage in the furrows. The use of collars was by no means general; and except in sandy soils and in soils subject to sudden alteration of character, they were not found essential to good drainage. In all the more porous subsoils in which collars had not been used, the more successful drainers increased the size of the pipes, in the minor drains, to a minimum size of two inches bore. Long main drains were found objectionable, and opposed to a sufficiently rapid action of any drainage system. The proper selection of outlets, and care for their preservation, were perhaps as essential to good and satisfactory work as anything belonging to the art of draining. A limit of twenty acres to an outlet, resulting in an average of perhaps fourteen acres, would appear by the practice of the best drainers to be about the proper thing. He would submit that, upon the fourth point—*direction of drains*—the results of the practice of the last few years had confirmed the principle of laying out the minor drains with the fall of the ground, in the generality of circumstances; that the principle of carrying the drains across ridge and furrow might be departed from, in certain soils, without disparaging effect; and that, let the direction of the drains be what it might, a constant and effective discharge could only be secured and maintained in perpetuity by carefully designing and by substantially securing the outlets, with regard to arterial channels. In the remarks which he had made, he had not referred particularly to the shallow-drainage system, especially as he saw present Mr. Bullock Webster, the champion of that, he had always said, departed system, and as he had himself so little to say in its favour. Being desirous, however, of stating every fact which might support a fair discussion, he would communicate the little favourable evidence he had collected. He found that Mr. J. E. Denison, of Ossington, drained strong clays 2 feet 6 inches deep; Mr. Milward, of Thurgarton Priory, still adhered to a depth varying from 2 to 3 feet; and Mr. Stephenson, of Throckley, to 3 feet. These were undoubtedly high authorities. But they must not forget that very nearly the last words Smith of Deanston wrote on the subject of draining were these: "I do not so much object to greater depths than three feet as I do to greater distances in all soils"; and although this was a sort of negative concurrence in increased depth, they were bound to believe that the founder of the shallow system saw reason to modify his first views. No one would presume to contradict Lord Wharncliffe in his declaration that his lands were improved by the method of mixed draining which he had adopted, simply because it would be impossible to deny that any drain, even two feet deep, could be put into land without doing some good; but the extent of improvement his lordship congratulated himself upon, and which he believed was manifest to every one, was doubtlessly to be ascribed in a much greater degree to the influence of the four-feet drains than to that of the two-feet drains; for it was impossible to reconcile with any laws of hydraulics or economy the union of the two depths in one system. The agricultural body were much indebted to Mr. Fowler, of Bristol, for his perseverance in exhibiting his draining-plough to the scrutiny of the public, as from time to time he had improved it. There could be no doubt that as practice made perfect, and steam-power took the place of horse-power, the hesitation which prevailed against its use would give way, and that they would find the draining-plough, or some other superior machine, adopted in all uniform clay soils with regular inclination of surface, where the parallel system was strictly applied. In conclusion, he must remark that it appeared to him that the subject was quite worthy of the attention of the Government, and that as the Legislature had constituted a branch of the Executive the protectors of the reversionary interests of settled estates, the Government was the proper authority to institute an inquiry into the whole practice of draining, with a view to set at rest, as far as possible, conflicting opinions, and to afford decisive data upon points of practice where data could be given; and it was not anticipating too much to believe that from such an enquiry would spring a measure for the improvement of arterial drainage as a fundamental object. (Hear, hear, and cheers.)

Mr. C. Johnson was quite sure he expressed the feeling of all present when he said that the farmers of this country were greatly indebted to Mr. Denton for the very able manner in which he had introduced the subject. Nor would his lecture be valued the less by the agriculturists of England on account of the cautious and moderate tone which pervaded it, the avoidance of all dogmatic assertion, and of the laying down of any general principle. It was impossible, he believed, considering the variety of soils and the variety of rainfalls which characterized the country, to state any general principle which would hold good throughout the length and breadth of the land. There was one point which Mr. Denton had omitted to notice, upon which he (Mr. Johnson) wished to make one or two observations. The grand object of all the drainers of this country appeared to be the getting rid of the water in the land—the hurrying it into the nearest ditch or adjoining river with all possible rapidity. Now he had urged on several occasions, and he would now venture to urge again, a plea on behalf of that water. He would put it to the meeting, whether the water which was so constantly being driven towards the sea might not be rendered available for the purpose of irrigation? The quantity of water drained out of the soil in the midland district of England, according to the very carefully conducted researches of Mr. Dickinson, of King's Langley, in Hertfordshire, amounted annually to about 26 inches. Of these 26 inches, it appeared about 11 inches were annually filtered from the soil, while 15 inches evaporated. Eleven inches represented about 1,100 tons of water per acre, it having been calculated that an inch of water was equal to about 100 tons per acre; and surely, when 1,100 tons of water per acre were drained from the land in the midland districts, it was important to consider whether in many situations it might not usefully be collected for the purpose of irrigation. Another important question, collateral to that which he had stated, was whether, in proportion as artificial manures were added to the soil, the water which was drained off did not become richer? The surplus water of poor upland districts might, indeed, contain little that could be useful to vegetation; but that which came from richly-cultivated soil, or soil containing guano and other artificial manures, could not be regarded in the same light.

The Chairman thought Mr. Johnson's remarks, however good in themselves, were not strictly applicable to the question.

Mr. Johnson thought, with submission to the chairman, that by showing the farmers that the water which required to be drained off contained properties which might afterwards be applied to the improvement of vegetation, he was in so far promoting drainage.

The Chairman.—It is good matter for a chemical lecture.

Mr. Johnson was convinced that in the adoption of a good system of drainage lay the foundation of agricultural improvement. He held in his hand the result of an analysis made by Professor Wilson, professor of agriculture in the University of Edinburgh. Professor Wilson asked himself this question, whether in this age, when a variety of artificial fertilisers were being applied to the soil in all directions, drainage water, for example, after a good dressing of guano, must not differ in composition from the same water before such an application of manure. The result of his investigation was to show a material difference. On analyzing some water on the 29th of April before it had received a dressing of guano, he found it to contain only three grains of organic matter; on making another analysis on the 16th day of May, after an application of guano, he found present seven grains. Under these circumstances, whether farmers adopted a deep system of drainage or a shallow one, it was, in his opinion, well deserving of their consideration whether the water which was drawn from the soil might not, in some form or other, be rendered available for the purpose of irrigation.

Mr. R. Baker said there was one element which entered into the question before them that Mr. Denton had not touched upon, but which was one of great importance to the tenant occupier. He meant the economy of drainage. In his district, and he believed in most other districts, the whole expense of the drainage must be met by the farmers themselves, and frequently this was done under very disadvantageous circumstances, from the fact that they had no security on the land, being merely occupying tenants from year to year. The prevailing mode of letting lands had, therefore, induced the farmer to adopt the least expensive system for effecting its drainage; and if the work was well done, without regard to duration—that was to say, if it were efficient for the purposes of the occupying tenant, during the period he held the land, that was all he would care to accomplish (Hear, hear). He submitted, then, that some of the old methods of draining might in such cases be resorted to as beneficially for the time being as the most elaborate tile draining that could be adopted. He knew he was venturing upon tender ground, and that he should startle certain gentlemen present, when he said, that a drain cut to the depth of from 20 to 30 inches, filled up with a portion of wood, and covered with straw, was a good and an effective one. He might be told by tile drainers that it was impossible to attain the object desired by such a drain; but he was willing to put in competition with any pipe drainage in the country, portions of the county of Essex which have been drained after this manner, at a cost of only 40s. an acre; and where the land was as effectually drained as it was possible to be by any of the more expensive processes (Hear).

Mr. Mechi.—On hard chalky clay soils.

Mr. Baker.—Hard chalky clay constituted the soil of half the counties of Essex, Suffolk, and the major part of Hertfordshire also. But he was not speaking of hard chalky clay alone; because the method he had described was carried out on various descriptions of soil. He admitted, however, that on soils alternative from clay to sand, and sand to clay, its adoption was impolitic, and that there the use of pipes or stone became absolutely necessary. But as the hard chalky clay extended over so large a portion of our counties, and the process mentioned had effectually attained the object, why go to more expensive processes, when that would do as well? (Hear, hear). Where the draining according to this system was well executed, it was generally found to last the duration of a lease of 14 years, and upon the wet chalky clays 21 years. He remembered the late Mr. Smith, of Deanstone, once delivering a lecture on the subject of drainage in that very room. On that occasion, he (Mr. Baker) expressed the same views he had expressed to-night, and invited Mr. Smith into Essex, to show him the extent to which the system was carried out. Mr. Smith accepted the invitation, and he (Mr. Baker), in company with Mr. Fisher Hobbs, showed him the lands so drained. Mr. Smith was astounded at the manner in which the drains operated; for he found that, although the wood and straw had wasted away and disappeared, the drains were perfect. In some of them he inserted his walking-stick its entire length; and he hesitated not to say, that with such a soil there was no necessity for any pipes whatever. Let gentlemen but investigate the subject as Mr. Smith had done, and he was satisfied they would arrive at the same opinion.

Mr. B. Webster said, having taken a very decided part for the last five years against the general adoption of a system of deep drainage in this country, he felt bound to thank Mr. Denton for the very able manner in which he had treated the subject. In fact he never heard the subject treated so ably before. He (Mr. Webster) had always been a strong advocate for draining spring lands and porous soils deep, at wide intervals, according to their nature; but he was convinced by experience that on retentive clay subsoils not surcharged with under-water, a depth of three feet, at moderate distances, was more efficacious than a greater depth. With the view of bringing the matter to a test, he would suggest that a committee of members of the club should be selected to accompany himself on a tour of inspection; and if his suggestion were adopted, he would pay every farthing of the expense incurred, provided he did not prove to the satisfaction of those gentlemen, whom he thought to be the greatest opponents of his own plan, that a system of three-feet drainage, at moderate distances, on the retentive clay soils of this country, would make the land in the most healthy condition both for agricultural operations and for the stock which was fed upon it. Nothing would do so much to settle the question as the appointing a committee to investigate and report to the club. The Government started by saying that they would lend no money for drainage which was not four feet deep. If their opinion had not undergone some alteration, why had they since departed from that principle.

Mr. Denton.—Have they done so?

Mr. B. Webster was informed on good authority of instances in which they had. Did time permit, he could enumerate many cases in which the system which he advocated had proved most successful, among which was the case of a gentleman on his left, Mr. Thomas, who occupied land on the Bedford estate. The question was not, however, between one mode and another. Every one who was at all acquainted with the matter, knew that springs ought to be treated as springs, and porous soils as porous soils; and as to the case of retentive soils not charged with under-water, he would be happy to leave it to a committee to decide from a comparison, whether four feet or three feet were most desirable.

Mr. Mechi said, having paid a great deal of attention to the subject of drainage, he felt that a new light had been thrown upon it that evening, by his friend Mr. Denton. Before, however, they decided in favour of any particular depth of drainage, they must, he thought, consider first, how far water would go down in heavy clays; and, how far the roots of plants would descend in such clays. He agreed with Mr. Denton, that there was a limit to the passage of water in very tenacious clays. He had found that below five or six feet, clay-land was flaked off, and no longer had the appearance of the soil within the range of filtration, that soil being homogeneous and tenacious, whereas what was below was slippery, in detached masses, and not affected by the drain. His own experience proved that a five-feet drainage was, on strong soils, an available system. As a tenant farmer, on one farm he proceeded on Mr. Baker's principle, of going the cheapest way to work. He drained the land five feet deep, at fifty feet apart, with 1-inch pipes, in the strongest clay, perhaps, that any one present ever saw. This cost him about 32s. per acre, and he was prepared to assert that it paid him amply. He could not say that it was as perfect as it ought to be; he believed it would have been more advantageous to put another drain between, making the drains twenty-five feet apart. The expense would have been doubled, but the outlay would still have been profitable to him. He had drained a good many acres with a depth of five feet and an interval of six or seven and twenty feet, and could assure them that the operation was in that case exceedingly profitable;

and, on the other hand, when he had gone beyond that distance, and drained fields at intervals of forty, forty-five, or fifty feet apart, he had found that he was wrong in so doing. He entirely agreed with Mr. Denton, that when the roots of plants came in contact with stagnant water, they turned away from it with disgust, as if they knew it would be fatal to their existence; and that in considering the proper depth of drains, it must be borne in mind that roots often penetrated to a depth of five feet. Why, he had himself known parsnip roots to run down thirteen feet six inches in the soil (laughter). The meeting might laugh; but he would refer them for confirmation to his friend Mr. Dickson, of Witham, on whose farm the thing occurred. The case was by no means singular; Mr. Hobbs had, he believed, tried some experiments with wheat in a number of hogsheads, and had found the roots going down from three feet six inches to five feet. Having tried various depths for draining, his conclusion was that, provided the water would filter through, the deeper they went the better. To that he would add, that if drains were put deep in the soil after a dry summer, it would be a very long while before any water would run out, as five feet of clay would hold a great deal of water in suspension. Mr. Baker had remarked that the chalky soils of his own district were very easily drained with bushes.

Mr. Baker: I did not say with bushes; but with wood.

Mr. Mechi continued: Mr. Baker had painted the sunny side of Essex. There was a large portion of the county to which his remarks were not applicable.

Mr. Thomas wished to guard himself against dogmatic assertion on this subject. In the instructive remarks of Mr. Denton, there was one point from which that gentleman appeared unwilling to swerve, namely an undeviating depth of four feet for drains. He (Mr. Thomas) was convinced that Mr. Denton felt that he was right in setting forth that principle; but at the same time it should be recollected that he did not assert, and he (Mr. Thomas) was sure he would not assert, that it was absolutely and perfectly right. His own experience in draining was much more favourable to the views of Mr. Bullock Webster. Having drained at various depths, he had invariably found that where the soil was of a tenacious consistency, drains three feet deep kept the land perfectly dry, and left at harvest-time a continued and unbroken level of corn-crop; so that practised husbandmen could not tell where springs were or where they were not. In a little field of five acres, the drains were four feet deep and forty feet apart; but what was the result? In that field he had never grown more than three quarters of corn per acre, and three-fourths of the land was often under water. He had now had the land gathered up into its old form, and was about to have drains made three feet deep. It might be true that certain roots extended to a depth of eight or nine feet; but it was not on that account to be supposed that the land would repay the cost of drainage of proportionate depth. Should Mr. Bullock Webster's suggestion with regard to the appointment of a committee be adopted, he should be happy to exhibit his own land. This was a case in which no fixed rule could be laid down. What was best in particular instances must depend on circumstances.

Mr. Mechi would like Mr. Thomas to state whether the four-feet drainage on the Duke of Bedford's estate had failed?

Mr. Thomas said that as far as his own knowledge went, he had never seen any drainage done four feet deep. He had not stated that the four-feet drainage was a failure.

The Chairman thought he might shorten the discussion by stating that draining was commenced close to his own farm at four feet; and that he believed the error was in the distance, the drains being put twice as far apart as they ought to have been. An additional drain had been made since, and the whole now did very well.

Mr. Walton said, that many years ago, long before deep drainage was thought of, he drained 100 acres of land at Chigwell, at a cost not exceeding £2 per acre; the drains being 16½ feet apart, and across the furrows. He used bushes, and cuttings of elm trees and willows, putting small bushes at the bottom, and large ones at the top. Every acre which was thus drained gave him a sack of wheat in the first crop. At the end of 20 years, he saw the drains running hard, and he was there to prove that they were running now (laughter).

Mr. W. Bennett, viewing the question practically, was of opinion that the truth lay between the extremes. The result of his own experience was, that in an open porous soil, with a good outfall, they could hardly go too deep; but this did not apply to strong tenacious soils. As regarded the question of expense, he was reminded of an observation of his late lamented brother's, namely, that he preferred draining himself to having the work done for him by his landlord; because it was better to incur a moderate expense at once than to have to pay a heavy per-centage for a long period. As regarded the Bedford estate, everyone knew that there had been some very good drainage upon it.

Mr. Stokes thought the great subject of discussion had been rather lost sight of, namely, what was the best general depth for drainage on all soils? He had seen a great deal of draining done in Nottinghamshire and Leicestershire, and was decidedly of opinion that four-feet draining was the most effectual that could be adopted, provided the drains were not placed too far apart. On strong tenacious soils the distance ought not to be more than 27 feet. If they had a gravelly subsoil, an interval of five-and-twenty yards would do very well. With regard to the materials to be used, Mr. Denton did not say much, though he recommended the use of pipes. He (Mr. Stokes) thought that when they were going to incur an expense of £5 per acre for permanent improvements, it was most important that they should use only materials which would prove permanent. For his own part, he should certainly never lay down pipes without collars; for in that case the end of one pipe would sink, and the drain be stopped up. With collars the drain would last a great number of years, and there would be no loss of capital.

Mr. Spooner said no one could doubt that evidence might be adduced to show that in some cases deep draining had answered exceedingly well; that in other cases extremely shallow draining had succeeded; and that in other instances, again, a medium system had been adopted with advantage. He could not help thinking that the contrariety of opinion on the subject was attributable in a great degree to the circumstance, that, when gentlemen spoke of clay soils, they did not state what was their precise nature. A clay might contain five-and-twenty per cent. of sand, or fifty per cent., or seventy-five; and it was folly to suppose that the same system of draining would answer equally well in each of those cases. The question was, when clays contained fifty per cent. of sand, and £5 per acre had to be laid out in draining, what system would answer best? He had himself examined various drains, and had found much greater diversity of operation than he could have imagined.

Mr. **Wood** quite admitted that four-feet drainage was superior in itself to drainage of less depth; but, after calculating the difference of cost as between three feet and four feet, he had arrived at the conclusion that the former answered his purpose best. He doubted whether the improvement of the land would be sufficient to meet the extra expense.

The **Chairman** said, having been himself for many years connected with draining, and having done a great deal on the farm which he occupied, he could not refrain from giving a faint outline of his experience. With regard to stiff tenacious clays—he meant those clays which contained no stone, which were not at all calcareous, and which, if a dish were made of them in the shape of a bowl, would hold water in the same way that a bowl did —his experience led him to the conclusion that the best way of draining such clays was to make the drains three feet deep, and eighteen feet apart. This conclusion he arrived at from observations which he had had an opportunity of making at Collington, near St. Ives. As regarded the depth of drain, they must always take into consideration the nature of the land to be operated upon. No precise line could be drawn as to three feet, four feet, or five feet. The only line to guide them was common sense, and if they adhered to that they could not go very far wrong.

Mr. **Denton**, in reply, observed: As regarded depth, he had not said whether the general depth should be four feet or five feet; what he contended was, that there should be some minimum. He was surprised to hear Mr. Baker and Mr. Thomas declare that it was of no use to go deeper than three feet if that depth would do. He maintained that three feet would not do. He had himself traced wheat roots nine feet deep; and, in the presence of some half-dozen scientific men, he had, on Lord Carnarvon's estate, in the middle of pasture ground, taken up two-inch pipes four feet deep, and found them filled with the roots of perennial grasses. He could not regard this otherwise than as an indication of natural habit. Let the soil be improved, and the roots of all plants would descend deeper; and the deeper the soil was, the better would it be for vegetation. He quite agreed with Mr. Spooner, that in dealing with clays they must have regard to their constituent properties.

No formal resolution having been offered, the proceedings terminated with a vote of thanks to Mr. Denton, and a similar compliment to Mr. Pain for his conduct in the chair.

THE ANNUAL DINNER OF THE CENTRAL FARMERS' CLUB.

The annual dinner took place on Thursday evening, Dec. 7, at Radley's Hotel, under the presidency of Mr. Owen Wallis, of Overstone Grange, Northampton, supported by Lord Berners, Mr. R. Baker, Mr. Trethewy, Mr. W. Bennett, Mr. J. T. Davy, Mr. Mechi, Mr. C. Johnson, the Rev. C. Day, Mr. Skelton, Mr. E. B. Burton, Mr. H. Hall (of Neasdon), Mr. Crosskill, Mr. J. Howard (Bedford), Mr. Shearer, Mr. B. Webster, Mr. Thomas, Mr. N. G. Barthropp, Mr. Wood (of Woodbridge), Mr. J. Williams, Mr. Page, Mr. Wood (of Cuckfield), Mr. Grainger, Mr. Cressingham, Mr. Denton, Mr. W. Spearing, Mr. J. Bell (Dover), Mr. R. Cheffins, Mr. W. Cheffins, Mr. J. A. Williams, &c., &c., upwards of eighty sitting down.

The loyal toasts having been received with customary enthusiasm,

The **Chairman** proposed "The Army and Navy." This duty was, he observed, one of great pleasure and also one of great pain. It was a pleasure to be able to offer a meed of praise, imperfect though it might be, to that gallant band who had at the Alma, at Balaklava, and at Inkermann won for themselves such immortal fame (loud cheers). If the blue jackets had not equally distinguished themselves on their native element, it was because the enemy had not dared to give them an opportunity, of which he was sure they would have made good use; and they had rendered essential service to the army on the heights of Sebastopol. While thinking of our brave army and navy, they must not forget their gallant allies (cheers). Costly as the war might be, it was to be held cheaply purchased if those who were our nearest neighbours by geographical position should henceforth be our fast friends. If, from their position in the field, our own troops had hitherto had the lion's share of the fighting, they had been nobly seconded by their French comrades. Let them hope that these gallant fellows would receive timely succour, so that when they next met the enemy it would be on more equal terms, and, though the result could not be more glorious, he trusted it would in that case be more satisfactory. With these observations, he called upon them to drink with nine-times-nine to the army and navy of Great Britain.

Lieut. **Davy**, in responding, expressed his inability as a humble subaltern of the militia adequately to represent the army and navy. With respect to that branch of the service to which he belonged, however, he would observe that its military knowledge was not very extensive because they had not been out long, but let them have the opportunity and they would no doubt show themselves Englishmen (cheers). He was ordered to join his own regiment next week, and it was, he believed, the earnest wish of nearly the whole body to be sent on active service (renewed cheers).

The CHAIRMAN said the next toast on the list was "Success to the London Farmers' Club." It was to be regretted that the club did not comprise greater numbers, and was not even more influential than it was. Some thought that by doubling the subscriptions they would double the number of members; others thought the effect would be precisely the reverse. On that subject he would not offer an opinion; but, so far as he was individually concerned, he had always valued the club for the opportunity which it gave farmers of assembling together, and discussing the details of agricultural operations in a manner which was likely to lead to the best results (Hear, hear).

The toast having been drunk with enthusiasm,

Mr. R. BAKER rose to respond. He assured them that no one in this country could entertain a higher opinion of the usefulness of the club than he did. In his judgment, the prosperity of the club did not depend so much on the amount subscribed as on the efforts of members to introduce new members, and to give the club the benefit of the abilities of others in its discussions as well as of their own. That the Farmers' Club was instituted for an object worthy of the country no one would deny. It aimed at introducing for discussion those subjects which had relation, and were most applicable, to farming pursuits. It endeavoured to elucidate scientific subjects, showing how they might be combined with practice, and made applicable to the great object of enabling the country to produce sufficient food for its inhabitants. There had been much speculation on that question; and if speculation were more rife at one time than at another, it must be in the present emergency. There was a period when they were told that it was not necessary to cultivate the soil; but it was now evident that if the soil had not been cultivated the people would have been deprived of their daily food. This showed how necessary their exertions were to ensure that that which was essential to the well-being of the nation should not fail. Swift wrote that he who made two ears of wheat grow where only one grew before, did more service to his country than the whole race of politicians put together; and at a time when the population was increasing at such an astonishing rate, while there was but a limited number of acres to supply its wants, it became the cultivators of the soil to make every acre of land produce all it was capable of yielding, and thus to place the nation in that position which could only be obtained through their exertions. He knew that some gentlemen were too apt to regard this question under a political aspect. He had on some occasions been questioned by gentlemen who represented them in the House of Commons as to how the Bridge-street Parliament was progressing. One member of that house recently said to him, jokingly, "How is it that, after all your discussions, you come to no very definite proposition or resolution?" To which he (Mr. Baker) replied, "I can't tell how it is, except that we are too apt to imitate our betters in that respect" (laughter). But, setting joking aside, he must say a most important era was opening to the agricultural world. Science had stepped into the field, and promised to do very much for the advancement of farming pursuits. They all knew the advantages of chemistry—a science which was not at all appreciated by agriculturists ten years ago. Every farmer who dealt largely in manure, and especially those descriptions of manure which were called artificial, must be aware that he was indebted to chemistry for protecting him against fraud, and for teaching him what he ought to buy and how he should proceed, in order that his money might be most advantageously invested in the soil. Such were some of the advantages derivable from chemistry. But there was a still wider field for its application—a higher pursuit in which it rendered valuable aid to the agriculturist. The constituent properties of soils were not at the present moment understood. The relative merits of soils as to formation and character were not generally known. Very few farmers were geologists; while, on the other hand, there were many geologists who, though not practical farmers, were enabled, chiefly through the medium of societies like that whose anniversary they were celebrating, to communicate information of the utmost value to the farming interest and to the country. Only two nights ago the club had a very able discussion on the principles of draining. A very clever paper was read, which led to a discussion as to the best depth and the best mode of arriving at the attainment of the object. Some gentlemen argued for one depth, some for another; but no one took a geological view of the question; no one observed that the depth which would be best for a stratified soil would not be adapted to an unstratified soil—that what would be most beneficial in the one case would be far from desirable in the other. Lord Berners, he believed, had had experience in this matter which enabled him to speak with something like authority. Mr. Trimmer had, if he recollected rightly, carried out his draining process on his lordship's estates—an estate on which the soil was so far stratified, or so far combined with other soils, that by a judicious distribution and arrangement of the drains, an object was effected which would not have been secured by the usual mode of proceeding. These were objects which were worthy of pursuit; and by means of discussions like those which took place in the club, information was diffused which tended most effectually to promote what conduced to the benefit of the many (Hear, hear). He held that while clubs established on the principles of the London Farmers' Club contributed greatly to the promotion of such objects as he had indicated, that club was especially useful in that respect, owing in a great degree to its central position, and to its being more easily accessible than any of the local clubs, to great numbers of agriculturists. The subscription of one pound a year was so small, that no person could be prevented from joining it by pecuniary considerations. Indeed, if the subscriptions were doubled or trebled, few should on that account hesitate to join its ranks. He held, however, that it was by combination—by numbers—that the great object was to be secured (Hear,

hear). They were not all of a scientific cast of mind; they were not all capable of combining science with practice; they were not all reading men; many members of the club were practical, while others were theorists; and by bringing the two classes together, and eliciting discussion on points of difference, the club was most likely to secure its object. The larger the number of men brought together in one society, the greater was likely to be the amount of benefit. He felt great pleasure, therefore, in responding to the toast; and at the same time he would press upon farmers the necessity of giving the club their confidence, and not their confidence only, but also their support. On the first establishment of mechanics' institutes great opposition was made to them. In like manner, on the first institution of farmers' clubs, the objection was taken that farmers could not meet without becoming political, and that in becoming political they would become mischievous. Such, however, had not proved to be the case. Politics were not treated of in their clubs. Successful endeavours were made to avoid them to the utmost; and although their meetings might sometimes be liable to division, he hoped they would never be exposed to contempt. He therefore urged farmers to give them their support, while pursuing to the utmost of their ability a course which was productive of benefit to the country at large, and more especially to the agricultural interest (cheers).

Lord Berners said he rose, in obedience to the orders of the Committee, to propose the next toast—and he could assure them he did so with great pleasure—"The health of the Chairman" (cheers). They were all witnesses to the excellent manner in which the Chairman had performed his duties, and he (Lord Berners) heard from all who knew him that he was a good farmer and a good man. He need say no more. His friend (Mr. Baker) had so completely cut the ground from under his feet, and there was really very little for him to add respecting the club. Long before this club was established, he proposed that a farmers' club should be formed in London. He was extremely happy to have his name enrolled as a member; for he was satisfied that through the medium of such institutions the best feelings were engendered, and the greatest benefit was secured to the agricultural interest. It had been remarked by the Chairman that one of the objects of the club was, that when farmers met together they might discuss topics of practical interest. He recollected that about this period last year the question of statistics was being discussed, and he then expressed it as his own opinion that if the farmers of two or three parishes were to make returns jointly, no inconvenience could possibly arise. His friend (Mr. Baker) had alluded to times gone by. He (Lord Berners) stated then what he would now repeat, that he was perfectly satisfied that had the wealth of the farmers of England, and the number of people whom they employed, and who were dependent on them for support, been more generally known, the farmers would never have been attacked and vilified in the way they had been. There was another point to which he desired to advert. He had not had the pleasure and advantage of attending any of the discussions of the past year, though he had perceived from the reports of the proceedings that some of the discussions were extremely interesting and useful. He did not know whether or not they had had under their consideration the question of an equality of weights and measures for the same district. He was tolerably well accustomed to the examination of parliamentary papers, and he found returns made of so many pounds' weight at Liverpool or Hull, and at the same time a quotation by imperial measure and the bushel. Again, there was the pernicious system under which a sale by quantity or measure had to be made up in weight (Hear, hear). He had protested against this in his own county. When times were bad, farmers were obliged to submit to it; but at present the advantage was in his favour. His own practice was to say, "There is the sample; if you don't like it you need not have it; I will not make up weight" (Hear, hear). This year his wheat-crop was so good, that he did not anticipate any such demand, the weight being 18 stone 8lbs. He was not going to trouble them with statistics. He must beg them, however, as practical farmers, occasionally to look at the parliamentary returns, with the view of ascertaining the quantity of wheat imported from year to year, and from month to month. It appeared to him that at the present moment it was particularly necessary that farmers should look at that question. During the last five months, with high prices, with every inducement to import corn into this country, there was a deficiency of considerably more than a million quarters—in the Liverpool reports it was stated at two millions—as compared with the importation of previous years. This, with a price ranging from 70s. to 80s., was a very great deficiency indeed, and from the best inquiries which he had been enabled to make, he thought there was no reason to suppose that there would soon be any great supply of wheat from abroad. This led him to the consideration of the eventful times in which they lived. How grateful ought they to be to that Almighty Power which had blessed them with an abundant harvest! If that had not been the case, in what condition, he asked, would they be now? With a crop as deficient as that of last year, and with the still greater deficiency in the supply of foreign corn, how would it have been possible to find the requisite amount of food for the people? (Hear, hear.) Thanking them for the kind attention which they had paid to his remarks, he would sit down by proposing the health of the Chairman.

The toast having been drunk with great applause,

The Chairman briefly returned thanks.

Lord Berners again rose, and said Mr. Baker had kindly alluded to his (Lord Berners') system of draining. The fact was that he had pursued that system for nearly twenty years, though he had carried it out with increased earnestness during the last seven or eight years. It happened that he was at the rooms of the Royal Agricultural Society when Mr. Trimmer gave his lecture. He remarked to that gentleman on the occasion that what had been then advocated in theory he had reduced to practice; and he offered to show him the whole system in operation. The information which he then offered to Mr. Trimmer he should now be happy to give to every individual present. If during the spring or summer months any member of the club would do him the favour to come down to Keythorpe and spend two or three days with him, he should be happy to give him an opportunity of judging whether the system answered or not (cheers). All that he would say on that point was that it answered so far as this—that cold, wet clay land was now a friable loam, and that upon land which tenants had refused to accept at a pound an acre he could grow five or six quarters of wheat. He was growing this year from 26 to 28 tons of mangel-wurzel—he had grown 40 tons—on this inferior land; and he could fold his sheep upon it.

Mr. **Thomas**, on rising to propose the next toast, said that club described but comparatively a very little circle in the world of agriculture, though they did their best. But there was another society which ramified throughout every county of England and Wales, and which held its meetings in all parts of the country—he referred to the Royal Agricultural Society of England (cheers). It appeared to him that that society had rendered great service with regard to the improvement of stock and the management of land. Mr. Thomas then proceeded with a most eloquent address, illustrating the high estimation in which agricultural pursuits had been held in all ages of the world, and observing that it was a happy moment for agriculture when the late Lord Spencer conceived the idea of forming a society from which agriculturists in all parts of the country derived so much benefit in the pursuit of their calling.

Mr. **Barthropp** said, as a member of the Council of the Royal Agricultural Society, he would merely observe that during the short time that he had had the privilege of attending the Council meetings, he had seen manifestations of the strongest desire to render the society as useful as possible to agriculture; and all that was needed to render the society still more useful than it had been was, that there should be an accession of members to increase the funds at its disposal. He hoped that if there were any gentlemen sitting round the table who were not members already, they would speedily become so (Hear, hear).

Mr. **Sidney** said, at the request of the committee—as a consumer, not as a practical farmer—he rose to propose a toast having reference to a society to which the country had long been indebted, and in whose prosperity it was especially interested at the present time. For when they were engaged in a war which they must all feel was likely to prove a very serious one, the feeding became quite as important as the fighting (Hear, hear). He rose to propose "Success to the Smithfield Club," and he would couple with it the name of a gentleman who now occupied the post of senior steward of that club, and who had distinguished himself as a practical farmer and as a breeder of Devon cattle. He referred to Lieut. Davey (cheers). This was a toast which must always be well received by the Farmers' Club, because it so happened that that club included the names of many who had signalized themselves at the Smithfield Show—Mr. Hudson, Mr. Hobbs, Mr. Jonas Webb, and others. Still stronger appeared the claims of the Smithfield Club to their sympathy when they considered the position which this country held with regard to the breeding of animals, compared with its position fifty years ago; and after having seen the magnificent shorthorn which was exhibited that week by his Grace the Duke of Rutland, and having regard to the general improvement which had taken place, it was with very great pleasure that he now proposed "Success to the Smithfield Club.

Lieut. **Davy**, in responding, said he was happy to be able to state that the Smithfield Club was in a position in which very few societies were—it had sufficient funds in hand to pay the next year's expenses (laughter).

Mr. W. **Bennett** proposed "Success to the Local Farmers' Clubs of the kingdom." The time was coming, he believed, and was near at hand, when the agriculture of their native land would be regarded in a right point of light. The period was past when anything like derision could be applied to a pursuit of such vast moment to mankind; and every one now admitted that with the well-being of agriculture was bound up that of the state. All history supported this view. As to local farmers' clubs, they had always been found an excellent means of promoting improvement in agriculture, and of diffusing useful information throughout the country. As to the misunderstandings which often arose between men of practice and men of science, he was convinced that in that case, as in many others, truth lay between the extremes; and while they should endeavour to prevent visionary men from leading the public astray, they must not neglect to examine what might aid the advancement of agriculture. He had lived long enough to learn that everything old was not necessarily bad. Farmers' clubs, when properly conducted, and when party politics were excluded from them, were, he was persuaded, of the greatest service to agriculture, by enabling farmers to ascertain all that was going on in the country, and especially in relation to their own occupations. It was, therefore, with great pleasure that he proposed the toast which had beenentrusted to him.

Mr. **Spearing**, of the Winchester Farmers' Club, responded, observing that farmers' clubs did much to supply the educational deficiencies, and to facilitate the safe advance of agriculture.

The remaining toasts included "The Committee," acknowledged by the vice-chairman, Mr. Wood, of Sussex; "The health of Lord Berners," proposed by Mr. Trethewy; "The Secretary, Mr. Corbet;" and "The Ladies," given by Mr. Shearer.

ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

The half-yearly meeting of the members was held on Saturday, Dec. 9, in Hanover Square; Mr. Miles, M.P., in the chair.

The Secretary, Mr. Hudson, read the following report:—

REPORT.

The Council have to report, that since the last General Meeting in May, the Society has lost 45 of its members by death or otherwise, while 135 new members have during the same period been elected on its list, which now contains—

89	Life Governors,
145	Annual Governors,
778	Life Members,
4236	Annual Members, and
19	Honorary Members.

The vacancy in the Council created by the death of Mr. French Burke has been filled-up by the appointment of the Earl of Darnley.

In consequence of the losses incurred by the meeting at Lewes, and by the non-payment of subscriptions due, the Council have found it necessary to sell out of the funds the sum of £1,500, thereby reducing the amount of funded property to £9,264. When all the out-standing claims of the Society, which by inattention have not yet been sent in, are paid, a fair balance will remain in the hands of the bankers.

The whole of the second part of the *Journal* for the current year is now in type, and in the course of being printed for distribution among the members. It will contain, among other papers, two lectures delivered before the Society by Professor Simonds, on the Age of Animals as indicated by their Teeth; and Professor Way's lecture on the Agricultural Action of Lime. The Council have agreed to the following schedule for the prize essays to be sent in for competition to the Secretary by the 1st of March next:—

Farming of Warwickshire	£50
Farming of Buckinghamshire	50
Chemical changes in the fermentation of Dung	30
Artificial Manures, and principles of their application	20
Artificial Feeding stuffs	20
Causes of Fertility and Barrenness in Soils	40
Retention of Moisture in dry Turnip Land	10
Prevention and cure of Mildew in cereal crops	20
Lameness in Sheep and Lambs	20
Any other agricultural subject	10
	£270

The country meeting at Lincoln has proved in every respect to have been one of the most successful hitherto held by the Society. The cordial greeting and hospitality the members received, the liberality of the Mayor, and the co-operation of the local committee, alike contributed to promote most effectively the objects of the Society on that occasion; while the special prizes offered by the Mayor to the owners of hunting horses and to the breeders of improved Lincoln sheep, and those for long-wool offered by the local committee, increased the variety of the show. A peculiar international interest was at the same time given to the proceedings by the presence of a body of gentlemen deputed specially to attend the meeting by his Majesty the Emperor of the French, as a mark of his respect towards the Society and the agriculturists of the kingdom. The trials of implements on that occasion were conducted with great care, and with strict attention to results. In the testing of power, two important inventions were introduced, which still further promoted that highly important object: namely, 1. Mr. Amos's improved dynamometer for self-registering, at one and the same time, the power and velocity required in working the various classes of machines exhibited; and, 2. Mr. Balke's employment of a vibrating pendulum, to supersede certain personal superintendence required previously in the trial of steam-engines. The Society have been indebted to Messrs. Easton and Amos and the Messrs. Ransomes and Sims respectively for the use of those instruments at the Lincoln trials.

The Council have accepted the invitation of the authorities of Carlisle to hold the Society's country meeting of 1855 in that city; and measures have already been taken for preparing the land for the trial of implements and for the purposes of the show-yard. The Council have agreed to the following schedule of prizes to be awarded at that meeting in the classes of cattle, horses, sheep, and pigs, namely:—

Short-horned cattle	£160
Hereford cattle	160
Devon cattle	160
Scotch cattle	105
Agricultural horses generally	150
Clydesdale horses	50
Leicester sheep	110
Southdown and other short-woolled sheep	110
Long-woolled sheep not Leicesters	110
Mountain sheep	40
Pigs	70
Total	£1,225

They have postponed to their first meeting in February the consideration of the question of prizes for farm poultry, and their decisions on those for agricultural implements and machinery.

The Council continue to be favoured by the Earl of Clarendon with returns furnished by the English Ministers and Consuls, of the existence of guano or nitrates within their respective jurisdictions. The noble Lord has likewise intimated that special instructions have been given by the Admiralty for investigations to be made by cruisers in tropical seas in cases where a probability of success is indicated by collateral circumstances. These various communications will eventually form a body of valuable evidence for the Society; and the Council cannot too strongly express their deep sense of Lord Clarendon's great interest in promoting the objects of the Society.

The French Government have transmitted to the Society, through the Minister of Agriculture and Commerce in Paris, a valuable collection of the most important agricultural works recently published in France; intimating that all requests from the Society for any information from France will be complied with. The Council, in acknowledging this mark of distinguished consideration on the part of the French Government, have availed themselves of the opportunity of transmitting a complete set of the Society's *Journal* for their acceptance.

The constant influx of new members from every part of the kingdom affords presumption of the public usefulness of the Society, and of the advantages derived from a national institution, which, uniting in itself so large a proportion of the agricultural community dispersed throughout the country, becomes a powerful engine for carrying into effective action those improvements or alterations, which, while tending to advance individual interests, promote the general welfare of the nation.

By order of the Council,
JAMES HUDSON, Secretary.

HALF-YEARLY ACCOUNT, ENDING 30TH JUNE, 1854.

RECEIPTS.

Balance in the hands of the Bankers, 2nd Jan., 1854	£1,107	8	10
Balance in the hands of the Secretary, 2nd Jan., 1854	14	7	10
Dividends on Stock	169	16	5
Governor's balance of Life-Composition	40	0	0
Governors' Annual Subscriptions	474	0	0
Members' Life-Compositions	340	0	0
Members' Annual Subscriptions	2,208	12	0
Receipts on account of Journal	334	0	8
Receipts on account of (Gloucester) Country Meeting	7	15	0
	£4,696	0	9

THOS. RAYMOND BARKER, Chairman.
C. B. CHALLONER.
WM. FISHER HOBBS.
SAMUEL JONAS.

PAYMENTS.

Permanent charges				£170	12	6
Taxes and Rates				13	19	2
Establishment				520	8	7
Postage and Carriage				26	16	4
Advertisements				9	9	9
Payments on account of Journal				629	0	2
Veterinary Grant, half a year				100	0	0
Veterinary Investigations				6	6	0
Chemical Grant, half a year				100	0	0
Chemical Investigations, half a year				150	0	0
Prizes				386	0	0
Payments on account of Country Meetings during the half-year:—						
On account of Gloucester	£784	14	9			
On account of Lincoln	516	3	10			
				1,250	18	7
Sundry items of Petty Cash				7	17	9
Balance in the hands of the Bankers, 30th June, 1854				1,295	6	9
Balance in the hands of the Secretary, 30th June, 1854				29	10	2
				£4,696	0	9

Examined, audited, and found correct, this 8th day of December, 1854.

THOS. KNIGHT.
GEORGE I. RAYMOND BARKER.
GEO. DYER.

Lord FEVERSHAM said he felt great pleasure in rising to move that the report which had just been read be received and adopted. Not having had an opportunity of investigating its contents previously, he was not in a position to make any lengthened observations; but so far as he was able to judge from hearing the report read, it was very satisfactory. There was perhaps one cause of regret, namely, the reported diminution in the funded stock of the Society. He hoped, however, that this would not long continue, and that any deficiency which now existed would ere long be made good. He would take that opportunity of congratulating the Society on the election to the office of President of his hon. friend in the chair. He had had the honour of his hon. friend's acquaintance for a long series of years, and he was sure it was a subject of congratulation to the Society, to find that it was now presided over by a gentleman who was so well acquainted practically with all the details of agriculture, and so competent to promote the interests of that great and important branch of the national industry (cheers).

Mr. R. W. BAKER, in seconding the motion, said the report appeared to him to be drawn up with great care, and he trusted that all it promised would be realized, and that everything that was practicable would be done for the improvement of the Society. In particular he hoped the Council would not lose sight of the state of the funds (Hear, hear). He trusted he should not be considered out of place if he remarked that if any arrear like that which now existed should accumulate in future, it ought to be attacked, if he might use the expression, much earlier. There was, it appeared, a large proportion of members who did not pay their subscriptions with regularity; and the result of this was virtually the infliction of a penalty upon those who did pay. The Council would do well to insist in future on early payment, and should determine that persons who had not paid for a certain period should cease to be members of the Society (Hear, hear).

The CHAIRMAN said perhaps Mr. Barker would in presenting the accounts avail himself of the opportunity of stating how it became necessary to withdraw £1,500 from the funds. He would at the same time be enabled to announce to this general meeting that at present the financial affairs of the Society were in a very satisfactory state, and that they would commence the next year with a considerable balance in hand at their bankers'.

The motion was then adopted unanimously.

Mr. R. BARKER, as Chairman of the Finance Committee, presented the accounts, which showed that the remaining stock of the Society amounted to £9,000, and that there was also a balance of £1,000 in cash. He said the Chairman had expressed a desire that he should say something with regard to the financial position of the Society. He would make one or two remarks. As far back as a twelvemonth ago, the Finance Committee had power given them to effect a sale of funded property to the amount of £1,500, in case they should consider such a step absolutely necessary. There was, however, at the time a considerable amount of subscriptions unpaid, and it was hoped that they would come in; and as, moreover, stocks were not in a good position for selling, the Committee hesitated, in the hope that they might be enabled to steer clear of the difficulty. Towards the autumn they found further delay impracticable, and a sale to the amount stated then took place. At the November meeting of the Council he was authorized to address—he would not say a remonstrance, but a calm statement of the difficulties of the Society—to those members who had not paid. Some delay occurred in getting out the circular, and it was not till the middle of the month that it was sent forth; and it was but justice to the gentlemen to whom it was addressed, and who were, in fact, only charged with inadvertence and inattention, to state that upon receiving the circular they most promptly responded to the appeal, and the result was that there had been a daily influx of something like £30 since that time (Hear, hear). They had balanced the account for the year 1854. There was, he believed, no claim against them except one in the form of an account for unavoidable repairs in the building in which they were assembled. The amount of this account would be paid as soon as it was certified to be correct, and there would remain a very creditable balance at the bankers' in favour of the Society. It could not be too frequently impressed on the members, that the means of the Society were its subscriptions. He agreed with Mr. Baker that it seemed rather hard that the willing horse should be always at work, while the sluggard remained behind and threw obstacles in the way of progress. If all the subscriptions were paid as they became due, the Society would never be placed in any difficulty. They were, however, now going on better, and had a more paying set of members than they had had for some time.

Sir J. V. **Shelley** moved a vote of thanks to the auditors for auditing the accounts. He must take that opportunity of remarking that the whole of the tightness as regarded money was attributable to the fact that, at the period of the Lewes Meeting, there happened to be a general election, and that the receipts of the show-yard fell off in consequence to such an extent that some time must necessarily elapse before they could quite recover. He confessed he did not look with great alarm upon the fact of their having been obliged to sell out a portion of their property in the funds. The investment in the funds must have been intended to meet any such accident as that which he had mentioned. He did not feel in the least degree despondent with regard to the present state of their affairs, and he believed the reported deficiency would soon be supplied. Though not a member of the finance committee, he had watched very narrowly the course which had been pursued, and he felt great pleasure in submitting the motion.

Mr. W. **Ashbury** seconded the motion, which was adopted.

Mr. **Dyer**, as one of the auditors, returned thanks for himself and his colleagues.

On the motion of Mr. J. Luce, seconded by Mr. Moorsop, the auditors were re-elected.

Colonel **Challoner** said he rose to move a vote of thanks which was well merited; and he was sure that when he mentioned the name the meeting would cordially respond. The name was that of Professor Way (Hear, hear), to whom the society owed a deep debt of gratitude for the light which he had thrown upon chemistry as immediately connected with agriculture. They all knew that certain points which were previously hidden and unknown to any one had been recently made public for the benefit of the farmer; and if the Society had been the medium of publicity, it must be recollected that it was to the exertions of such men as Professor Way that they were to look for the origin of these advantages. No person could have heard the Professor's lectures without appreciating them; and until the publication in the next number of the *Journal*, the public could not possibly conceive the excessive labour which had been undertaken for the benefit of agriculture. There was one particular in which the labours of the Professor had been especially useful; he referred to the facilities which he had afforded for the detection of adulteration in manures (Hear, hear). This was a matter of greater consequence to the farmer than almost anything else. If a farmer went into the market, and gave £12 a ton for an article which was not intrinsically worth £2, he was robbed by wholesale; and it would be difficult to conceive anything more detrimental to his interest than the liability to such frauds. Professor Way had fearlessly and honestly carried out his researches on that subject; he had pointed out where the shoals lay; and if the farmer were shipwrecked hereafter, it would not be the fault either of the Professor or the Society. He would not detain them any longer; he had already said quite sufficient to show that Professor Way was well-titled to their thanks.

The motion was seconded by Mr. Barthrop, and adopted.

Professor **Way** said it was exceedingly gratifying to him to receive this testimony of the interest which the Society took in his researches and lectures; and it could not but tend to enhance their success. The meeting was of course aware that, in researches of this kind, discoveries which were at first attended with great *éclat*, being the payment, as it were, of the arrears of science as applied to agriculture, excited less interest in subsequent years. The first bursts of discovery were naturally considered the grandest. If the details were worked out only by slow and almost imperceptible degrees, the progress made was equally important with the first discovery; but then it was not so striking, and did not excite such general interest. They must not expect, in agricultural chemistry, to make great and rapid discoveries: he, for one, had never supposed that they would do so. The great work of science, in its application to agriculture, seemed to be the gradual elimination of ideas on the general subject. He formed every day a better conception of the real objects of science as applied to agriculture, and a more general diffusion of knowledge on the subject. Colonel Challoner had introduced the question of the adulteration of manures. That was a question which came home more immediately to the farmer than almost any other; but he hoped that, after a time, they would have succeeded in producing a feeling among the dealers in manure that no adulteration was possible (Hear, hear); that, by keeping the cat active, they would prevent her from having any mice to kill. This result was, in fact, being gradually brought about. The dealers were becoming more honest, and a better class of men were entering the trade (Hear, hear). The effect was slow, but he had no doubt it would soon be realized.

Mr. **Barker** said there was another professor to whom he felt that it would be an injustice not to acknowledge his services. It might, indeed, be said, and with truth, that that gentleman had been thanked before; but still he did not think a general meeting should be allowed to pass over without some acknowledgment being made of the valuable services which he had recently rendered to agriculture. They had had a most powerful demonstration of the value of his labours that very week, the Professor having entered upon a task which appeared never to have entered into any one's conception before, his object being to afford means of ascertaining the precise age of all animals by means of an examination of their teeth. Such an excellent collection of models had hardly ever been submitted to public inspection before. So successfully was the idea brought into practical operation, that it had been shewn that sheep sent in for prizes which were returned as seventeen weeks old, were almost as many months (laughter). As long as they could keep their mouths shut, it was all very well; but when these were open there could no longer be any mistake. The plan which he referred to would soon be in print, and every one would be enabled to purchase it in the forthcoming number of the Society's Journal. He felt great pleasure in proposing a vote of thanks to Professor Simonds.

Colonel **Chatterton** seconded the motion, which was put and adopted.

Professor **Simonds**, in returning thanks, said he wanted no other stimulus than this kind appreciation of his services to induce him to persevere in his efforts to advance the cause of science in connection with agriculture.

The **Chairman** having vacated his seat, in which he was succeeded by Colonel Challoner,

Sir J. V. **Shelley** said he rose as a member of the Council, and as one who had from the first taken part in the proceedings of the Society, to move a vote of thanks to their President, Mr. Miles (cheers). He felt strongly that they had done well in inviting that gentleman to take the chair of this great Association; and he could say personally, from having been connected with him as a steward of the implement-yard for several years, that zealous as many others were in conducting the operations of the Society, he knew no man who had from the commencement so invariably devoted himself, at a great sacrifice of time and labour, to the furtherance of the interest of the agricultural body; he therefore felt great satisfaction in proposing a vote of thanks to Mr. Miles, not only for his conduct in the chair that day, but for the regularity and ability with which he had attended to the affairs of the Society.

The motion, after having been seconded by Lord Feversham, was carried by acclamation.

Mr. **Miles** said he felt exceedingly obliged for the manner in which this vote had been submitted to and received by the meeting. He must say he should find the greatest difficulty in fulfilling properly his duties as president, were it not for the co-operation and assistance which he met with in the council and the committees. Associated, however, as he had been with them from the very infancy of the Society, he felt that they were the persons who carried on the actual business, and that beyond sitting in the chair, there was really very little for the president to do. It had always given him the greatest possible pleasure to labour for this society. He thought it commenced in the proper way by not taking science alone for its guide, but science with practice. He need scarcely make any allusion to what had already been done. It must be perceptible to all who travelled through the country, whether they went north, south, east, or west, that the improvement which had taken place in agriculture since the commencement of the Society was immense (Hear, hear). Whether he looked at the breeds of cattle, whether he looked at the cultivation of the soil, whether he looked at the eradication of noxious weeds, or whether he looked at the use of artificial manures, he found on all hands marks of improvement. Every effort had been made by agriculturists to avail themselves, as far as possible, of the advantages which this Society conferred upon them; and through their industry and intelligence they were now enabled to provide, per acre, a considerably greater quantity of corn, and a considerably greater quantity of beef, than they provided at the commencement of the Society's career (cheers). It must, therefore, be to him a great source of satisfaction that the Council had honoured him by placing him in the situation which he occupied. Had he known, indeed, beforehand that it was their intention to do so, he should respectfully have declined the honour; but it came upon him unawares, and he was elected before he had the slightest idea that he should be even named for the office of president. He could not but be aware that there were many who had higher claims to that distinction than himself. Having, however, been placed in that situation, he should not shirk its duties, but should endeavour honestly, faithfully, and with effect, to promote the great object of the Society—namely, the benefit of the cultivator of the soil, and of the country in general (cheers).

The meeting then separated.

ON INCREASING THE SUPPLY OF OUR RIDING-HORSES, AND THE ENCOURAGEMENT BREEDERS SHOULD RECEIVE FROM OUR AGRICULTURAL SOCIETIES.

It has been our duty frequently within the last two or three years to impress upon our agriculturists, or those whom they take as their leaders, the good policy of more directly recognizing and encouraging the breeds of our hunting and riding-horses. With the exception of the Yorkshire and Suffolk Societies, we do not know one in either England, Scotland, or Ireland that has given anything like that attention it should to the merits of the well-bred horse. In fact, such associations but too commonly pass him over with the most studied indifference. It would almost appear, from their proceedings, that the breeding of good horses was not a matter of sufficient importance to command their countenance; or, at any rate, not a pursuit upon which the farmer should be expected to engage.

The grand object of course of an agricultural exhibition is mainly obtained by the force of example. That, then, which such a body does not invite to take a place at its meetings, we may justly enough conclude it indirectly tends to ignore. The effect, in fact, can scarcely be otherwise. Cattle, sheep, pigs, even poultry, and perhaps draught horses—but no further. Since, however, we first touched on this subject as a matter of policy, it has become one of necessity. Some would have it that our roadsters and hunters were sadly deteriorating; the more cause then for our looking to them. Thanks, though, to those too often maligned works—the Racing Calendar and the Stud Book—this was quickly seen to be but a false alarm. We may be short of horses, as little doubt we are; but never were there such opportunities for breeding good ones as we at present enjoy. Hunters, hacks, and chargers are still rising in price; the very Government has had to spring a figure. Nothing, in a word, promises to pay, or has paid, better of late, than that constant desideratum, "a good sort of horse."

And who, pray, should be the first to profit by this? From whom should we look chiefly for the supply to meet a demand so long growing upon us? The answer is self-evident. Who can breed him so cheaply, or rear him with so little inconvenience, as the farmer? It is his business in fact, we might almost say his pleasure. But it is a business he has sadly neglected, and one that few have cared to put him in the right way of proceeding with. They will tell him that he *must* have the best blood for a Shorthorn or a Devon, for a Southdown sheep, or a Berkshire pig. They put the best sorts before him, and insist upon the absolute need for his using them. It will pay him to do so. At the same time they take no heed of the best blood for horses, but let him cross under-bred animals with perhaps worse, and hence the rips on the strength of which "our breed of horses is deteriorating."

We introduce with this, at a season but too opportune, a letter from our esteemed correspondent, Mr, Willoughby Wood. We trust that we shall not be accused of partiality when we pronounce it to be, in our opinion, one of the most valuable papers ever written on the subject to which it is devoted. Mr. Wood, it will be found, goes at once to the evil and the remedy. The former is the sheer neglect with which agriculturists have regarded the breeding of riding-horses. As he truly says—"Farmers who would not grudge trouble with regard to any other department of their business, are in this matter unaccountably remiss. They put their mare to the first horse which walks into their yard, having no knowledge whatever of him; while they are ignorant of the very existence of horses of first-rate reputation standing a few miles from their own residence." This is it. And yet our country gentlemen, if they have pre-eminently a taste, it is for hunting, and the use of a good horse. So they assemble in committee, and start societies, and draw out prize lists, and invite their tenants to breed good oxen and sheep; but not a word about good horses. We don't want them; and they wouldn't pay perhaps. Unfortunately we do want them; and they would pay—hardly anything better.

But, then, as a rule they must be good. The means to ensure this are simple enough. It is but the same principle on which we obtain all other good stock—by the use of the best-bred animals. Now, there is no animal in this country so purely bred, or none whose influence is so strong on what he may be crossed with, as the thorough-bred horse. Mr. Wood's recipe is what has always been our own: put your hackneys, and half-bred mares of all descriptions, to none but the thorough-bred horse. Considering the perfection to which we have brought him, it is astonishing to see how often we are urged to bring him down again. Mr. Wood refers to some of this nonsense—for it is really nothing more—which it seems was given some time since in "a highly popular publication."

We do not ourselves remember to have seen it, but it can certainly have been no great loss. To improve our cavalry, the magnificent, powerful, and high-couraged English race-horse is to be passed over, and we are to go back to the Arab, and breed weeds and palfreys. We fancy our contemporary, "the highly popular publication," whatever it may happen to be, did not gather its renown on the strength of such reasoning as this.

The proffered advice from Mr. Spooner to the Royal Agricultural Society, for crossing half-bred mares with half-bred horses, was so palpable a mistake that we took upon ourselves at once to show its fallacy. We have no doubt but Mr. Spooner wrote with the best intentions; we gave him every credit for doing so at the time we noticed his communication. Unfortunately, however, he took the fact of any one daring to differ in opinion with him as a mortal offence, and replied in a spirit that we should be very sorry to imitate. We can venture still to assure him that there are not ten men in England, who know anything about the breeding of a horse, that would be likely to back his theory.

We commend Mr. Wood's remarks on this point to his especial attention. We commend the whole letter to the several committees and managements of our agricultural societies, great and small. Honestly it touches on a duty they have but so far neglected. Above all, we would commend it to the farmer himself. It will be to his interest to study more carefully the subject of it. He has every means ready at hand for following out the advice here offered. If he so chooses, he may breed good horses even with the material he now has, and so, with far less expense than he would, or has, set about producing good beasts or sheep. Let him search out a thorough-bred stallion in his neighbourhood. Let him run his eye over the list of stallions, as given each succeeding spring in the *Farmers' Magazine*—some hundred and fifty really well-bred horses. There are many more, no doubt, never advertised at all; and we should so surmise there are few homesteads in England without one handy. What, then, is to prevent the farmer from rearing a colt or two annually, that it shall be his pride to show and his profit to sell.

We hear the Council of the Royal Agricultural Society had some intention of offering a series of such prizes as are here referred to, for the ensuing meeting at Carlisle. They, however, were ultimately induced to confine anything extraordinary in this way to the classes of Clydesdales. We can only say that we are very sorry to find they cannot do more.

ON INCREASING OUR SUPPLIES OF CAVALRY HORSES.

SIR,—I address you once more on the subject of horses. My object in doing so is, the great importance to the country which an adequate supply of cavalry horses is beginning to assume. During the two last years, the demand for every description of useful horses has exceeded the supply. Agricultural horses never were known to be so scarce, nor to fetch such prices. Three-year-old fillies have in many districts fetched upwards of £50, and colts of the same age £60, while even foals have commonly been sold for £20 each—a price which, some years since, would have bought a colt of an age fit to work. The prices of hunters have been, and still are, enormous: indeed, of those which combined power with good looks, it may be said that the value is pretty nearly what the owner chooses to put upon them.

Such being the case, it cannot excite surprise that it has lately been found necessary to raise the price given for cavalry horses, which may be regarded as forming a class between those used in agriculture and those devoted to the chase. Of ordinary troop-horses, indeed, a certain number would, if not purchased for the army, have been employed in farming operations, being the most active and best breed of that class; while the remainder would have found work as low-priced hunters, as hacks, and carriage-horses. It is thus evident that an extraordinary demand for troop-horses must always, of itself, tend to diminish the supply and raise the price of the general stock of horses throughout the country. But at the present time, coexistently with such a demand, there is also a greater demand than usual for farm-horses, while the call for hunters does not appear to diminish, and that for hacks and carriage-horses is probably also on the increase. Under these circumstances, the supply of horses is, for many years to come, likely to fall short of the general demand for them; and, as a natural consequence, their price will be higher than it has ever been.

It becomes, then, a question of importance alike to the community and to the agriculturist, How is the supply of horses fit for cavalry purposes to be increased? It is an anomaly which ought not to be borne by a nation so celebrated as ourselves for horses, that we are only able to send our cavalry by hundreds, when our enemy sends his by thousands into the field. If, therefore, we are to increase the force of our cavalry regiments, as not only patriotism but common prudence calls upon us to do, it follows that the agriculturist will find highly-remunerative employment for his capital in the breeding of horses.

To point out the manner in which he must proceed in order to produce the best animals, and thus to realise the highest prices of the market, has been the object of the letters which I have already addressed to you. In the present communication I propose to confine my remarks to one point—viz., the choice of a sire.

A paper appeared a few months back, in a highly-popular publication, on the subject of cavalry horses, in which the writer assumed that the bulk of those at present used in our army were too large; that to cross our ordinary breeds with thorough-bred horses would only add to the evil, inasmuch as it would add upright shoulders and washy constitutions to overgrown size; and suggested as a remedy the cross with Arabian sires. The assertions of the writer with regard to thorough-bred horses I shall at present pass over, with the remark that they can only have been made by one practically unacquainted with the noble breed which he libels. But are our cavalry horses too large for their work? Certainly, not those of the ordinary regiments. With regard to those of the Life Guards, the Blues, and other heavy regiments, the answer may be doubtful; but, at any rate, the weight they have to carry must be lessened before the horses themselves can be reduced in size and substance. The work which a troop-horse has to do much resembles that of a weight-carrying hunter, with the proviso that it is more severe, and that speed is not so primary an object. Now, the best size for a hunter is from 15 hands 2 inches to 16 hands, both inclusive. A horse below the former height seldom fetches more than a moderate price for this purpose; and a tolerably long experience in the hunting-field convinces me that this is not a prejudice, for, although I have possessed many excellent horses of small size, not one of them was entitled to the appellation of a first-rate hunter. That is to say, whatever might be their speed, however extraordinary might be their powers of fencing, they were unable to go through a severe day, in which both endurance and speed were required in the highest degree, without exhibiting undue signs of distress. On the contrary, I have had several horses above the size which I prefer—that is, more than 16 hands—which were able to go through runs of more than ordinary severity, with ease at the time, and without requiring a longer rest than usual to recruit them. I conclude, therefore, that from 15 hands 2 inches to 16 hands is the best size for cavalry horses, as for hunters.

With regard to the use of Arabs as sires for cavalry horses, I wish to speak with considerable diffidence, because my own personal experience of them is but limited. As far, however, as it extends, it is decidedly adverse to their employment, unless in exceptional cases. The few Arabs I have seen were characterized by the upright shoulders which the writer to whom I have alluded attributed to our thorough-bred horses. They were, moreover, low in the forehand (an unpleasant conformation for the rider), and apt to be too drooping at the pastern. The progeny of Arabian sires, out of English mares, is usually small and light of bone, though pretty, and possessed of showy action. Their character is that of park-hacks or of ladies' horses; and they would at once be rejected by any officer purchasing troop-horses, as unfit to carry even the lightest of our so-called "light-cavalry" troopers. Unless, then, for the exceptional case of an over-sized or enormously powerful mare, it is useless to expect cavalry remounts from the use of Arab sires.

A much higher authority has recommended that recourse should be had to sires like the weight-carrying hunter, with the view of perpetuating the breed of horses under consideration. I an convinced that such advice, if largely carried out, would lead to the most fatal results. Your readers may perhaps recollect that I have always strongly insisted upon the necessity of purity of race on the part of the sire, whatever may be the class of animal which it desired to produce. That the male ought to be thoroughbred, or of an accredited pedigree, and of a higher caste if possible than the female, is a maxim I believe unanimously upheld alike by the highest theoretical and practical authorities in breeding. For my own part, I never knew it departed from without signal failure. Taking only one or two of the more obvious considerations connected with such a course into account, it is obvious that such must be the almost inevitable consequence. On what ground does any man, who reflects at all, select a sire? Why, that he wishes her offspring to resemble him. But it is well known that the power possessed by either parent of imprinting their own type upon their offspring depends upon the purity of blood and antiquity of race of each. Thus the offspring of a thorough-bred short-horn bull and a common cow will frequently resemble very closely the character of the pure short-horn. In like manner, when a hackney mare or a Welsh pony is put to a thorough-bred horse, the offspring shows indications of being much more than half-bred, or in other mares it resembles its high-bred sire more closely than its low-bred dam. Supposing then that a person wishes to have a horse resembling a three-parts bred weight-carrying hunter, the most unlikely method which he can take to gratify his desire is to put a mare to a stallion so bred. Like effects are produced by like causes, and by no other. His weight-carrying hunter having been produced not thus, but quite otherwise, so he may be assured that only as it was produced, and in no other way, has he any chance of obtaining its like again. A three-parts bred sire, let his individual excellence be what it may, is a mongrel and nothing else; and it is against every calculation of probability to assume that he will perpetuate his own good qualities to the exclusion of the baser elements which exist in his pedigree.

Or, to view the subject for a moment under another aspect. It is quite possible that the great grandsire of the three-parts bred stallion may have been a cart-horse. It is notorious that in numerous cases the offspring partakes less of the character of its immediate parents than of its remoter ancestors. Who then shall guarantee the offspring of such a sire from exhibiting one or more of the undesirable qualities of such a cross, either the heavy shoulder, or the deficient courage of the cart-horse? Let no authority then, however high, tempt the farmers of England so far to depart from sound principle as thus to breed; for they may be assured by so doing they are, in a matter sufficiently dark and intricate, throwing away every guide and landmark which might otherwise aid them in their course.

The only method of increasing the number of really valuable horses which can be depended upon, is for every man who has a good mare, of whatever breed, (always excepting those only adapted for the dray) to send them to the best thorough-bred stallion within his reach. If a mare is worth breeding from at all, she will in this manner produce a better foal than any other. Suppose, for instance, that she is a cart-mare, at once powerful and active, a good bay or brown, quick stepping, and with a roomy frame; it is highly probable that her offspring by a well-selected thorough-bred horse will turn out a handsome carriage-horse, or one well-adapted for artillery service. Suppose, however, that her owner does not desire to sell her for either purpose, and only wishes to breed for the purpose of recruiting his team. Well, in that case he will obtain an animal which will accomplish, if well kept, at least one-third more work than an ordinary farm-horse. Were the teams of my Staffordshire and Derbyshire neighbours thus bred, they might diminish their number by one-third without impairing their real strength. The old-fashioned prejudice that because a horse is fit for a higher occupation than drawing the plough, therefore he is not fit for that, is deeply-rooted over a large portion of the kingdom; but it must yield at last to the force of truth, and ocular demonstration of the contrary. Or take the case of a mare of somewhat inferior grade—such, for instance, as the farmer drives in his trap, or the tradesman in his light cart; what useful and valuable horses might we not expect from their union with a thorough-bred horse? It is from animals so bred, that horses for almost any conceivable purpose are furnished. According to individual peculiarities exhibited by each, will one colt make a hunter, another a light or heavy cavalry-horse, another a hack, or another still a brougham or cabriolet-horse. In one, power may predominate; in another, action; of some, their figure may be the chief recommendation; while a fortunate few will possess all three in due and happy combination. These are the high-priced hunters or the guardsman's chargers.

Of mares more highly-bred than the two classes I have alluded to, I shall not here speak, since they are certain, if used for stud purposes at all, to be put to thorough-bred horses. I wish to impress upon agriculturists, and to induce landowners to impress upon their tenants, the expediency, under present circumstancs, almost amounting to a duty, of providing an increased supply of horses available for the military service of their country. The course which I recommend is one, which, so far from causing them extra expense, will, if properly carried out, bring them in as large a share of profit as the rearing of any other kind of stock. The real state of the case is this:—In every district there are to be found numerous mares with abundant strength, and with many other good points, but wanting that one quality (without which the horse ever remains the pariah of his tribe), viz., the power to move with speed and ease. Put such mares to a stallion no better bred than themselves, and you perpetuate the disqualification in their offspring. Such is the parentage of the hundreds of low-priced brutes which disfigure our fields, and are a drug in our fairs. It seems as though some evil-disposed enchanter had cast his spell upon them, and condemned them for the term of their existence to the slavery of the higgler's cart, since for lighter labour they are utterly unfit. No effort of their own, no external persuasion, could take them over four miles in half an hour. A horse which cannot on a pinch do thus much is worthless indeed. But put the mare which I have described to a thorough-bred horse, with good action, and the spell of immobility is removed as regards the foal. He will pick up his feet freely, and set them down in front of him; his muscles will be supple, his bone flat, and his gait easy: and all this without the sacrifice of power or substance. Indeed I would caution the inexperienced breeder who has such a mare, not to select too large a stallion, for the offspring of such a union is apt to err rather in oversize and in clumsiness than in deficient power.

In former letters I have adverted to the strange mistake so commonly made, of connecting the idea of high breeding with want of substance. It may suffice here to repeat, that by no other means than by those I am now recommending, is so much EFFICIENT POWER to be obtained. If, indeed, you want a "stand-still horse" for show, there is nothing like a dray horse; but if you required one to carry from fourteen to seventeen stone on his back at a moderate pace, or to draw a heavy carriage, or to assist in moving a gun, depend upon it there is nothing superior to the offspring of a useful, clean-limbed, working mare by a thorough-bred horse.

It is an important matter to be certain that the stallion you employ is actually thorough-bred. Many horses travel up and down the country with long and showy pedigrees, professing to be thoroughbred, which are not so. I last summer, in Yorkshire, saw in the same field two mares, one the daughter of the other. The elder mare was not only the better shaped of the two, but gave tokens of being better bred. I inquired of the owner whether the sire of the younger was a thorough-bred horse? He answered that his owner asserted him to be so; but that he suspected this was not the case. On looking at the horse's pedigree I found that he could not be thorough-bred. Such I believe to be a by-no-means-uncommon case, even in Yorkshire. But farmers who would not grudge trouble with regard to any other department of their business, are in this matter unaccountably remiss. They put their mare to the first horse which walks into their yard, having no knowledge whatever of him; while they are ignorant of the very existence of horses of first-rate reputation standing a few miles from their own residence, perhaps in the very town whose market they weekly frequent. The only proof of a horse being thorough-bred, which ought to be relied on, is the fact of his being in the Stud Book. It is a great advantage if he is also to be found in the Racing Calendar. It is by no means necessary for ordinary purposes that a horse should have been a brilliant winner; but a preference ought certainly to be given to one who has done something. For my own part I would far rather pay £5 for putting a mare to a horse whose speed and bottom had been proved by frequent victories, than £2 for the services of one who, never having tried, might be a worthless brute.

Of the other essentials of a stallion, next to high pedigree and proved prowess, I would place the formation of the shoulders, the position and conformation of the fore-legs, and the shape of the neck and head. On these, space not permitting me to dilate, I must condense my meaning by saying that no horse ought to be used for the class of mares I am speaking of, which has not shoulders well receding, a good fore-hand, a refined head, and a neck long enough, yet with sufficient substance: above all, his action must be as good as possible, as much of the value of his stock will depend upon their inheriting this quality.

The convictions which I hold on this subject are the result of no brief experience, and of no cursory observation. Since, however, I have been the owner of Red Deer, they have received additional strength from the opportunities which I have possessed of watching the progress of his progeny from the mares which have been sent to him by other persons. I must say that in numerous instances in which I have prognosticated failure, I have been agreeably mistaken, and that mares whose exterior was of the most unpromising kind have produced excellent foals by him. In point of size and substance especially, his stock more than bear out what I have always maintained on this subject. I will quote one or two instances. A farmer put two mares of his team—the one to Red Deer, the other to a cart-horse. The difference in size is so striking between the two foals, that persons at a distance always mistake in guessing which is the son of the thorough-bred horse. Another farmer put an insignificant-looking little mare, about 15 hands high, to Red Deer. The foal promises to obtain great size, while his action and general appearance seem well suited for making him a hunter. I have two foals of my own out of thorough-bred mares, one by Red Deer, enormously lengthy, and of great strength; the other by a Yorkshire coach-horse (the mare having belonged to a farmer previous to my purchasing her), which is small and insignificant, compared with the first. It is probable that the coach-horse might weigh half as much again as Red Deer, and therefore to the inexperienced would seem to possess more substance. The surplus, however, being chiefly made up of fat and "offal," is not transmitted to another generation. I attach next to no importance to the size of the sire, provided he does not come of an under-sized family. Gameboy is a small, mean horse in appearance, yet is the sire of several winners at the Yorkshire agricultural shows. His blood—that of Tomboy, which I have already eulogised—is sufficient guarantee for the excellence of his stock. Red Deer, standing sixteen hands high, is rather above than under the medium size; while his blood, being that of Venison on one side and of The Colonel on the other, cannot be surpassed either for endurance or for speed, nor have his achievements on the course often been exceeded. Such are the sires likely to beget stock suitable for every purpose for which they may be required.

On another occasion I may, perhaps, enter into details connected with the mutual relations both of form and blood between sire and dam calculated to ensure the most successful results as regards the offspring. At present, both time and space forbid me to say more than that, as a general rule, a better foal will be obtained from a useful but somewhat under-bred mare, by putting her to a good thorough-bred horse, than by resorting to any other cross.

I remain, your obedient servant,

WILLOUGHBY WOOD.

Holly Bank, Burton-under-Needwood,
Nov. 2.

THE BIRMINGHAM CATTLE AND POULTRY SHOW.

When Columbus broke the egg by way of making for it a steady foundation, everybody was astonished that they had not thought of that before. The fact was so self-evident, and the means so simple, that one only need to try to be certain to succeed. The way to a new country was, no doubt, easy enough of accomplishment by any man who had only sufficient courage and perseverance to follow it out. So has it been with the Birmingham Cattle Show. Famously situated, in the very centre of an extensive district long renowned for its different breeds of stock, where could any meeting of the kind be more appropriately convened? Admirably fed by lines of rail from all parts of the kingdom, where could we look for a better attendance? Numbering amongst its citizens men proverbial for their energy and public spirit, and supported by county families of deservedly high esteem, what could be wanting to give at once a character and position to such a Society?

These are the self-evident questions that have been put, now that they have been answered. Birmingham itself has ably demonstrated what might be done, by doing it. This has been proved, however, rather by hatching the egg than by breaking it. Seldom, indeed, have the jockey's orders to take the lead and keep it been more thoroughly carried out. Through evil and good report, over all the absurdities of a mania that could only rise to fall, has the poultry show of the Midland Counties continued to flourish. It never, either, prospered so legitimately, or with so certain a promise of lasting, as it has during this week. What cattle shows have done for our stock, this show has done for our poultry. The rara avis in terris is such no longer. The one good bird or so, which came only to prove how bad were nearly all the others, can now expect no such distinguished a position. In nearly all classes nearly all were good, and the judges confessed they never had their experience so hardly tried as they found it at this meeting. But poultry, we must repeat, is no longer a mania. It may still certainly be more or less the especial pursuit of the amateur; shorn, however, of nearly all that "fancy" character which once made it his business alone. Our breeds of chickens were unquestionably never so good, while they were as certainly never so easily to be obtained. We hear no further of hundreds and thousands, except as a joke. Birds are sold for what they are worth, and a lot, even of prize Cochin China, may be had by the catalogue figures at a pound a-piece.

Self glorification is but an ungrateful task; it may be remembered, though, that some two or three years since, when this same Cochin China was in the very height of his ascendancy, we were the first to dispute his claims. We argued that for almost any purpose, either appearance, quality, or economy, we had fowls long known amongst us immeasurably his superior. For the farmer particularly we maintained there was no bird like the Dorking. Time, too, has fully justified us in this. For real use, the direct object for which poultry are supposed to be kept, there *is* no bird like the Dorking. This was the chief attraction of last week's show. If there had been a gold medal for the best pen of fowls of any kind, to this sort must it have been awarded. For beauty, or really fine plumage and shape, there is only one variety superior to the Dorking cock; while for the table there is none, we believe, equal to it. The handsomest, or to use a yet more significant term, the most "thorough-bred" of all, is the Game fowl. A new and very commendable feature in the Birmingham Show of this year was a series of prizes for the best cock, singly, of each particular kind. The Game, as might be expected, were very strong here. The first prize-bird was decidedly, as far as form and plumage went, the best of the whole exhibition. It is seldom so perfect a one has been shown. He was the property of Mr. France, of Ham Hill, Worcester, but sold at the price marked in the catalogue—five pounds.

Nearly co-equal with the Dorking and Game came the Spanish, a breed which for general purposes many maintain are amongst the very best we have. They have been considerably improved upon of late, and never made a better display than on this occasion. We are here again, studying barn-door capabilities. The Hamburghs, on the other hand, though of almost every possible tint and spangle, were thought to be on the decline. The same may be yet more decidedly written of the Malays; whereas the Cochin Chinas, that once fashionable colour more particularly known as the "Buffs," were much better than of late. There appears, however, not the slightest chance of their regaining anything of their quondam popularity. It was amusing indeed, to notice the common neglect with which they were treated. Their warmest supporter, Mr. Sturgeon, now ranks no higher than "a commendation," though Mr. Punchard still holds his own as a first prize man.

It would be impossible for us to find room for a prize sheet, running to such an extent, and divided into so many sections as that of the poultry department of the Bingley Hall Show. We have endeavoured, however, to convey some notion as to its general character, as well as of the state of the market. The dearest of all now seem to be the Bramah Pootra, possibly because they are the scarcest. Assuming they will ever come into general request, there is no fear that they will soon find their level from forties and fifties to common sense prices. Unable as we are to do full justice to the awards, we may yet avail ourselves of the opinion of the judges, as to be gathered occasionally from a note in the prize list. They recorded, then, two classes of the silver-spangled Hamburgh as "*meritorious*," the coloured Dorkings as "*very meritorious, and deserving the highest commendation.*" The cinnamon and buff Cochins were, on the same authority, "*an excellent class*;" the white Cochins "*a very good class.*" The Dorking cocks shown singly, "*a very excellent class.*" The Spanish cocks shown singly were "*the whole class commended.*" The Game fowl, blacks and brassy-winged, as a class "*generally meritorious*;" the white Aylesbury ducks also "*generally meritorious*;" and the turkeys "*a very good class.*" As for the Aylesbury ducks, we never remember to have seen anything like so generally excellent a collection, and we have known them some time, too, both at home and abroad.

Whatever the visitor's real object may be, he is supposed on such an occasion to come above all things to see the poultry. We have so made this department the leading feature, as it is, perhaps, the great attraction of the exhibition. We must not dismiss it without a word to the taste the Committee have shown in turning some of their money premiums into silver vases. We think, indeed, the plan might be still extended with advantage. A prize of a sovereign or two is, after all, a matter of no consideration; whereas a piece of plate, however small in value—more vases or flower-cups—would be far more esteemed. The breeding of poultry, it must be borne in mind, is yet scarcely out of the hands of the amateur. What more appropriate, then, than some such præmia palmæ for the Reverend Mr. Finch, or the Honourable Mrs. Partlett?

When we find, year after year, how one show is made to support the other, we come the more to wonder how the Smithfield and Birmingham meetings should ever have been allowed to clash. Without the opportunity of visiting the two, one cannot fairly ascertain how the different breeds of stock are just at present supported. By the experience of the Smithfield Show, for example, we might have written the Hereford cattle as going rather out of fashion. Birmingham steps in, opportunely enough, to correct this. The best beast here was a Hereford—he took the gold medal as the best. The best cow here was a Hereford, and she took the gold medal as the best. There was no want of competition, either, to damage such proof. The gold medal cow at Smithfield—that mistaken notion of Mr. Towneley's—was at Birmingham. She was here, again, the best of her sort; but not, the Judges decreed, the best of all. The show of Shorthorn cows and heifers, in fact, went very much as the week previous—Mr. Towneley and Mr. Langston again first and second with their cows, and Mr. Phillips with his heifer. These classes—the Durham cows and heifers—were altogether very good, and might have been generally commended. The Shorthorn oxen and steers, on the other hand, were quite as remarkable the other way. A rougher lot, taking them all, we never remember to have seen; and there was nothing like a first-class animal amongst them. Mr. Stratton, it will be observed, took the uppermost place, with a beast undistinguished at Smithfield, and by no means in high favour here.

A limited entry of Devons still spoke more satisfactorily to the general excellence of the sort. We do not remember a bad animal amongst them. The show, however, was chiefly confined to our best known exhibitors: Prince Albert and Lord Leicester carrying all before them. The Prince's Devon heifer, first here, was the second prize at Smithfield; while of Devon cows there was only one exhibited, but to that one the judges very properly awarded the premium. For general merit, we must repeat, the lead was unmistakeably with the Herefords: when we come to consider the good cows and heifers in both the Durham and Devon classes that succumbed to a Hereford, we may fairly assume that Mr. Stedman's was a very perfect animal. She exhibited, indeed, both in form and colour, all the best points of her breed, and had a round, low, and broad contour, not always the distinguishing marks of the sort. Mr. Heath's gold medal ox, though apparently not so highly bred, had fattened into a very serviceable beast; still his superiority over those against him was not so apparent—a fact that speaks well for the general strength of the entry. It is remarkable that the gold medal beast of the Birmingham Show at this meeting is the twin-calf of the one which took the same honour last year. In the Hereford steers Prince Albert and Mr. Niblett with the same two animals changed the places they occupied in London—the Prince here being the first and Mr. Niblett the second. It will be recollected the same thing happened last year with two Shorthorn cows, and public opinion declared that the Birmingham was the more correct award. There is little choice, though, in this instance: both are very good, and two fresh sets of judges would be quite as prone again to differ.

Of the other kinds of cattle, the Long-horn has but a local repute that is not very likely to extend in its influence. Far more popular, one would imagine, must be the Highlanders and Scots, of which there were some very capital specimens. Birmingham, in fact, is commonly strong in these classes—the best quality of meat, we are assured, that the butcher can procure, and yet a beast never shown to the extent that might be expected. The Duke of Beaufort exhibited some promising crosses of the West Highlander with both the Gloucester and Jersey cow, the former obtaining a commendation from the judges.

In the show of sheep, considerable advance was observable—especially in the Southdowns, by far the best ever seen here. Despite the absence of the Duke of Richmond, Lord Walsingham could not improve on the two second premiums he took at Smithfield—a sufficiently significant fact of what he had against him. The sheep, however, above all others peculiar to Birmingham, is the Shropshire Down, one of the most useful varieties we have, and that is daily growing into repute. One of the great secrets of the sheep-breeder is this improving or enlarging on the frame of the pure Southdown; and we can only say it has been most successfully attempted by "the proud Salopians." It is being more boldly tested with other breeds, as some very excellent pens of cross-bred sheep bore witness to. They were all Downs on one side, crossed with the Leicester, Cotswold, and Oxfordshire Longwools; the most successful being with the Cotswold.

In the pig classes—once a strong point in a Midland Counties show—there was a very observable falling-off, both in the number and quality of those exhibited. It has often struck us, indeed, that of late we have scarcely been advancing so systematically with the pig as with our other breeds of animals. The best show we have seen for some time was one of Berkshire pigs, in Ireland. There were but few of this kind at Birmingham, the show running almost entirely on Prince Albert's, Mr.

Wiley's, and the Cumberland or Yorkshire white pig, with a sprinkling of the curious coloured Tamworth. The most noticeable matter in this department was the very strong certificate signed by the referees, against the only two pens of pigs shown by the Duke of Sutherland, as being considerably above the age at which they were entered. We shall look with some anxiety for the explanation as to how his Grace, or those who act for him, have fallen into this mistake.

The dinner on the opening day being that on which her Majesty opened Parliament, naturally kept many away who would otherwise have supported Lord Leigh. As it was, with scarcely any attempt at set-speech making, the evening passed pleasantly enough, under his Lordship's direction —a most hearty and straightforward chairman, who came at once to what he had to say, with a very happy effect on those who had to follow him. We have seldom had to endure less clap-trap from the after-dinner orator.

It would be unfair to conclude this notice without some expression of the general regret felt for the absence of Mr. Wright—a gentleman who may be fairly recorded as the very Columbus of the Society. In his temporary absence, however, there was no lack of good management or arrangement. In truth, of all the many meetings we have to attend, we know of none superior, and very few equal, in the conduct of its business, to the Birmingham Show. The catalogue, for instance, is a very excellent work in its way—a prospectus, list of prizes, committee, &c., the entries for stock and poultry, with an index giving the name and number of every exhibiter, and, lastly, the award of prizes, all bound up in one goodly pamphlet, and all ready for you by the private view.

AWARD OF PRIZES.

JUDGES OF CATTLE.—Mr. John Booth, Killerby, Catterick, Yorkshire; Mr. Philip Halse, Molland, near South Molton, Devon; Mr. Henry Chamberlin, Desford, near Leicester.

JUDGES OF SHEEP AND PIGS.—Mr. Valentine Barford, Foscote, near Towcester; Mr. John Moon, Eggesford, near Chulmleigh, Devon; Mr. John Meire, Newport, Salop; Mr. Benjamin Swaffield, Pilsbury, near Ashbourne.

REFEREES FOR THE AGES OF PIGS.—Professor Simonds, Royal Veterinary College, London; Mr. William F. Hollingsworth, Bilston.

VETERINARY INSPECTOR AND GENERAL REFEREE.—Mr. R. L. Hunt, New-street, Birmingham.

CATTLE.

HEREFORDS.

CLASS I.—OXEN OR STEERS.

First prize, £10, also the Gold Medal, and extra prize of £20, for the best ox or steer in the yard, Mr. William Heath, Ludham Hall, Norwich. Breeder, Mr. Thomas Carter, Dodmore, Salop.

Second prize, £5, the Earl of Warwick, Warwick Castle. Breeder, Mr. John Ashwood, Downton-on-the-Rock, Herefordshire.

Two beasts shown by John Naylor, Esq., Leighton Hall, near Welshpool, Montgomeryshire, were highly commended, and one by the Duke of Beaufort, Badminton, Gloucestershire, commended.

CLASS II.—STEERS.

First prize, £10, his Royal Highness Prince Albert, Windsor Castle. Breeder, Mr. John Burlton, Luntley, Dilwyn, Herefordshire.

Second prize, £5, Mr. Isaac Niblett, Conygre House, Filton, Gloucestershire. Breeder, Mr. T. L. Meire, Cound, near Shrewsbury.

Commended, Lord Hatherton, Teddesley, exhibitor and breeder.

CLASS III.—COWS.

First prize, £10, and silver medal as breeder, also the Gold Medal, and extra prize of £20, for the best cow or heifer in the yard, Mr. William Stedman, Bedstone Hall, near Ludlow, exhibitor and breeder.

Second prize, £5, Mr. William Cother, Middle Aston, near Woodstock, Oxon, exhibitor and breeder. (Has had ten calves born alive.)

CLASS IV.—HEIFERS.

First prize, £10, Mr. William Heath. Breeder, Mr. Wm. Stedman.

Second prize, £5, Mr. William Hall, Ashton, near Leominster, exhibitor and breeder.

Highly commended, Mr. Philip Turner, The Leen, Pembridge, near Leominster, exhibitor and breeder.

SHORTHORNS.

CLASS V.—OXEN OR STEERS.

First prize, £10, and silver medal as breeder, exhibitor and breeder Mr. Richard Stratton, Broad Hinton, near Swindon.

Second ditto, £5, Mr. John Henry Lees, Bacon's End, Coleshill. Breeder, the late Mr. Lees, Coleshill.

Highly commended, Lord Leigh, Stoneleigh Abbey, Warwickshire.

CLASS VI.—STEERS.

First prize, £10, and silver medal as breeder, exhibitor and breeder Mr. Lovell Cowley, Ashby St. Ledger's, Daventry.

Second ditto, £5, exhibitor and breeder Charles Barnett, Esq., Stratton Park, Biggleswade, Bedfordshire.

CLASS VII.—COWS.

First prize, £10, Charles Towneley, Esq., Towneley Park, Burnley, Lancashire. Breeder, Mr. Alexander Bannerman, South Cottage, Chorley, Lancashire.

Second ditto, £5, exhibitor and breeder James Haughton Langston, Esq., M.P., Sarsden House, near Chipping Norton, Oxfordshire.

Highly commended, exhibitor and breeder Mr. William Moore, Plumpton, Ripon.

Commended, W. T. Cox, Esq., Spondon Hall, near Derby.

CLASS VIII.—HEIFERS.

First prize, £10, Mr. Joseph Phillips, Ardington, near Wantage, Berkshire. Breeder, Mr. James Fussell, Laycock, near Chippenham, Wiltshire.

Second ditto, £5, exhibitor and breeder Mr. William Fletcher, Radmanthwaite, near Mansfield, Nottingham.

Highly commended, Mr. Henry Brown, Linton, Derbyshire, and Viscount Hill, Hawkstone, Shropshire.

DEVONS.

CLASS IX.—OXEN OR STEERS.

First prize, £10, and silver medal as breeder, exhibitor and breeder the Earl of Leicester, Holkham, Norfolk.

Second ditto, £5, exhibitor and breeder the Earl of Leicester.

Highly commended, exhibitor and breeder the Earl of Aylesford, Packington, Warwickshire.

CLASS X.—STEERS.

First prize, £10, his Royal Highness Prince Albert. Breeder, Mr. George Turner, Barton, near Exeter.

Second ditto, £5, exhibitor and breeder the Earl of Leicester.

Commended, exhibitor and breeder the Earl of Aylesford.

Class XI.—Cows.

First prize, £10, the Earl of Leicester. Breeder, Lord Portman, Bryanstone, Blandford.

Class XII.—Heifers.

First prize, £10, his Royal Highness Prince Albert. Breeder, Mr. Samuel Farthing, Stowey Court, Bridgewater, Somersetshire.

Second ditto, £5, Mr. William Heath. Breeder, William Howe Windham, Esq., Felbrigg Hall, Norwich.

Commended, exhibitor and breeder the Earl of Aylesford.

LONGHORNS.

Class XIII.—Cows or Heifers.

First prize, £10, and Silver Medal as breeder, Mr. Samuel Burbery, Wroxhall, near Warwick, exhibitor and breeder.

Second prize, £5, Mr. Samuel Burbery, Wroxhall, near Warwick. Breeder, Mr. Joseph Holland Burbery, Kenilworth Chase, Warwickshire.

FOR OTHER PURE BREEDS AND CROSS-BRED ANIMALS.

Class XIV.—Fat Oxen or Steers.

First prize, £10, and Silver Medal as breeder, Mr. Richard Hawkes, Hunscote, near Wellesbourne, Warwickshire, exhibitor and breeder (Cross).

Second prize, £5, Mr. Phineas Fowke Hussey, Wyrley Grove, Walsall, exhibitor and breeder (Longhorn).

Commended, John Naylor, Esq.

Class XV.—Fat Cows.

First prize, £10, and Silver Medal as breeder, Mr. Richard Timms, Branston, near Daventry, exhibitor and breeder.

Second prize, £5, Mr. William Bodington, Montagu House, Kenilworth, exhibitor and breeder (cross between Alderney and Durham).

Class XVI.—Fat Heifers.

First prize, £10, Mr. James Stewart, New Market, Aberdeen. Breeder, Mr. George Stodart, Cutter Cullen, Udny, Aberdeenshire (cross between an Aberdeenshire cow and a Shorthorn bull).

Second prize, £5, Mr. James Lawrance, Cawston, Rugby, exhibitor and breeder (Cross).

Commended, Mr. William James Sadler, Bentham Purton, Swindon, Wiltshire (Cross), and the Duke of Beaufort, exhibitor and breeder (cross between a West Highland Scotch bull and a Gloucester cow).

SCOTCH OR WELSH BREEDS.

Class XVII.—Oxen or Steers.

First prize, £10, Ralph Sneyd, Esq., Keele Hall, Staffordshire. Breeder, Mr. M'Dougall, Branallach, Lochanside, Argyleshire (West Highland).

Second prize, £5, the Duke of Beaufort (West Highland Scotch).

Highly Commended, Ralph Sneyd, Esq., exhibitor (West Highland), and Mr. William Heath (Galloway Scot).

Class XVIII.—Heifers.

Prize, £5, Mr. Richard Thomas, Ryton, Shiffnall. Breeder, Viscount Hill (Scotch).

EXTRA CLASSES.

(For Animals not qualified to compete in any of the preceding Classes).

Class XIX.—Oxen or Steers.

[No entry.]

Class XX.—Cows or Heifers.

Silver Medal, Mr. Benjamin Wilson, Brawith, Thirsk, exhibitor and breeder (Shorthorn).

Highly Commended, Lord Feversham, Duncombe Park, Helmsley, Yorkshire.

SHEEP.

Class XXI.—LEICESTERS.

For the best pen of three Fat Wethers, not exceeding twenty-two months old.

First prize, £10, and Silver Medal as breeder, also Silver Medal as exhibitor of the best pen of Long-woolled Sheep in Classes 21, 22, 23, and 24, George Saville Foljambe, Esq., Osberton Hall, near Worksop, Nottinghamshire.

Second prize, £5, the Marquis of Exeter, Burghley Park, near Stamford, exhibitor and breeder.

Highly commended, Mr. Lawrence Willmore, The Newarke, Leicester, exhibitor and breeder.

Class XXII.—LEICESTERS.

For the best pen of three Fat Wethers, exceeding twenty-two but not exceeding thirty-four months old.

[No entry.]

Class XXIII.—LONG-WOOLLED SHEEP NOT BEING LEICESTERS.

For the best pen of three Fat Wethers, not exceeding twenty-two months old.

First prize, £10, and Silver Medal as breeder, Mr. William Slatter, Stratton, Gloucestershire. (Cotswold.)

Second prize, £5, Mr. William Hewer, Sevenhampton, Highworth, Wiltshire, exhibitor and breeder. (Cotswold.)

Class XXIV.—LONG-WOOLLED SHEEP NOT BEING LEICESTERS.

For the best pen of three Fat Wethers, exceeding twenty-two but not exceeding thirty-four months old.

First prize, £10, Mr. Thomas Walker, Newbold, near Rugby, Warwickshire. Breeder: Mr. Thomas Fourshew, Withington, Gloucestershire.

Second prize, £5, Mr. Thomas Walker, Newbold, near Rugby, Warwickshire. Breeder: Mr. Thomas Fourshew, Withington, Gloucestershire.

Class XXV.—SOUTH AND OTHER DOWN SHEEP.

For the best pen of three Fat Wethers, not exceeding twenty-two months old.

First prize, £10, and Silver Medal as breeder, Mr. John Williams, Buckland, Berkshire, exhibitor and breeder. (South Down.)

Second prize, £5, Lord Walsingham, Merton Hall, Thetford, Norfolk, exhibitor and breeder. (South Down.)

Highly commended, Viscount Hill, exhibitor and breeder.

Commended, Earl of Leicester, exhibitor and breeder.

Class XXVI.—SOUTH AND OTHER DOWN SHEEP.

For the best pen of three Fat Wethers, exceeding twenty-two but not exceeding thirty-four months old.

First prize, £10, and Silver Medal as breeder, also Silver Medal as exhibitor of the best pen of Short-woolled Sheep in Classes 25, 26, 27, and 28, Sir Robert Throckmorton, Bart., Buckland, Faringdon, Berkshire. (South Down.)

Second prize, £5, Lord Walsingham, exhibitor and breeder. (South Down.)

Commended, Lord Walsingham, exhibitor and breeder. (South Down.)

Class XXVII.—SHROPSHIRE AND OTHER BLACK OR GREY-FACED SHORT-WOOLLED SHEEP.

For the best pen of three Fat Wethers, not exceeding twenty-two months old.

First prize, £10, and Silver Medal as breeder, Thomas Charlton Whitmore, Esq., Apley, Salop, (Shropshire).

Second prize, £5, Mr. Stephen Matthews, Montford, Shrewsbury, exhibitor and breeder.

Class XXVIII.—SHROPSHIRE AND OTHER BLACK OR GREY-FACED SHORT-WOOLLED SHEEP.

For the best pen of three Fat Wethers, exceeding twenty-two but not exceeding thirty-four months old.

First prize, £10, and Silver Medal as breeder, Mr. William Foster, Kinver Hill Farm, near Stourbridge.

Second prize, £5, Earl of Aylesford, exhibitor and breeder.

Commended, Earl of Aylesford.

Class XXIX.—CROSS-BRED SHEEP.

For the best pen of three Fat Wethers, not exceeding twenty-two months old.

First prize, £10, and Silver Medal as breeder, also Silver Medal as exhibitor of the best pen of Cross-bred Sheep in

Classes 29 and 30, Mr. Adam Corrie Keep, Wollaston, Northamptonshire, (South-down and Cotswold).

Second prize, £5, Mr. William Gillett, Southleigh, Oxfordshire, exhibitor and breeder. (Oxfordshire Long-woolled and South-down).

Highly commended, Mr. Adam Corrie Keep, exhibitor and breeder. (South-down and Cotswold).

Commended, Lord Walsingham, exhibitor and breeder. (South-down and Leicester).

Commended, Mr. William Gillett, exhibitor and breeder. (Oxfordshire Long-woolled and South-down).

CLASS XXX.—CROSS-BRED SHEEP.

For the best pen of three Fat Wethers, exceeding twenty-two but not exceeding thirty-four months old.

[No entry].

PIGS.

CLASS XXXI.

For the best pen of three Fat Pigs of one litter, not exceeding ten months old.

First prise £10, and Silver Medal as breeder. His Royal Highness Prince Albert, exhibitor and breeder.

Second prise, £5. Mr. James Wyley, jun., Longdon, Rugely, Staffordshire, exhibitor and breeder.

Disqualified on account of age. His Grace the Duke of Sutherland, Trentham, Staffordshire, exhibitor and breeder.

The certificate of the referees with regard to this entry:—

"Birmingham, Dec. 11, 1854.

"We hereby certify that we have this day examined three pigs, pen No. 181, exhibited at the Birmingham Cattle Show, and represented to be nine months and three weeks old, and are of opinion that they exceed the age named by many weeks.

(Signed) "JAS. B. SIMONDS.
ROBT. L. HUNT.
W. F. HOLLINGSWORTH."

CLASS XXXII.

For the best pen of three Fat Pigs of one litter, not exceeding fifteen months old.

First prize, £10, and Silver Medal as breeder. His Royal Highness Prince Albert.

Second prize, £5. Mr. James Wyley, jun., exhibitor and breeder.

Disqualified on account of age. His Grace the Duke of Sutherland, Trentham, Staffordshire, exhibiter and breeder.

The certificate of the referees with regard to this entry:—

"Birmingham, Dec. 11th, 1854.

"We hereby certify that we have this day examined three pigs, pen No. 189, exhibited at the Birmingham Cattle Show, and find that the state of the dentition of one of the pigs in particular indicates that the animal is much older than set forth in the owner's certificate.

(Signed) "JAS. B. SIMONDS.
ROBT. L. HUNT.
W. F. HOLLINGSWORTH."

Disqualified on account of age. Mr. William James Sadler. Bentham Purton, Swindon, Wiltshire, exhibitor and breeder.

The certificate of the referees with regard to this entry:—

"Birmingham, Dec. 11th, 1854.

"We hereby certify that we have this day examined three pigs, pen No. 190, exhibited at the Birmingham Cattle Show, and represented to be fifty weeks and four days old, and are of opinion that the general appearance of their mouths and state of their dentition show them to be above the age named.

(Signed) "JAS. B. SIMONDS.
ROBT. L. HUNT.
W. F. HOLLINGSWORTH."

CLASS XXXIII.

For the best Fat Pig exceeding fifteen months old.

First prize, £6, and Silver Medal as breeder. James Baldwin, Esq., King's Norton, Worcestershire.

Second prize, £3. James Baldwin, Esq., exhibitor and breeder.

CLASS XXXIV.—PIGS OF A LARGE BREED.

For the best pen of five Pigs of one litter, exceeding three and not exceeding six months old.

First prize, £10, and Silver Medal as Breeder, Mr. William James Sadler, Berkshire.

Second ditto, £5, Mr. William Hewer, exhibitor and breeder.

CLASS XXXV.—PIGS OF A SMALL BREED.

For the best pen of five Pigs of one litter, exceeding three and not exceeding six months old.

First prize, £10, and Silver Medal as breeder, Robert Harrison Watson, Esq., Bolton Park, near Wigton, Cumberland.

Second ditto, £5, Mr. John Alderson, Thornby, Aikton, Cumberland, exhibiter and breeder.

Highly commended, Mr. S. Brodhurst Hill, Bach Hall, Chester, exhibitor and breeder.

Commended, Robert Harrison Watson, Esq., exhibiter and breeder, and Mr. Samuel Wiley (two pens), exhibitor and breeder.

PRIZES FOR ROOTS.

SWEDES.—First prize, Silver Medal, Messrs. Proctor and Ryland, Elmscote; second ditto, £1 1s., Mr. Robinson, Derby: third ditto, 10s. 6d., Mr. James Wylie, Longdon.

LONG RED MANGOLD WURZEL.—First prize, Silver Medal, Mr. A. H. Johnson, Gunnersbury.

YELLOW GLOBE MANGOLD WURZEL.—First prize, Silver Medal, Messrs. Proctor and Ryland; second ditto, £1 1s., Mr. E. Loomes, Whittlesea, Cambridgeshire; third ditto, 10s. 6d., Mr. S. Druce, Eynsham, Oxon.

CARROTS.—First prize, £1 1s., Mr. E. Loomes.

WHITE GLOBE STUBBLE TURNIPS.—First prize, 10s. 6d., Mr. A. H. Johnson.

ORANGE JELLY TURNIPS.—First prize 10s. 6d., Mr. Rose, Northbrook, Warwickshire.

KOHL RABBI.—First prize, Silver Medal, Mr. T. Burbidge, Mona Cottage, Edgbaston, Birmingham.

OX CABBAGE.—First prize, £1 1s., Earl of Aylesford; second ditto, £1 1s., Mr. Palmer, Yardley.

Cup given by Mr. T. Burbidge, seedsman, of Birmingham, for the best twelve swedes, grown by any one person from Baldwin's seed. The Judges highly commended the whole, but gave the prize to Mr. Baldwin, of Wilmcote, Warwickshire.

The general display of Roots was considered by the Judges to be very good.

THE JUDGES OF POULTRY were the Honourable and Reverend Stephen Willoughby Lawley, Escrick Rectory, near York; George James Andrews, Esq., Dorchester; Mr. John Baily, Mount-street, Grosvenor-square, London; the Reverend Robert Pulleine, The Rectory, Kirby Wiske, near Thirsk; the Reverend William Wriothesley Wingfield, Gulval Vicarage, Penzance; William Symonds, Esq., Rodwell House, Weymouth; Mr. Thomas Challenor, Burnt Leys, Whitwell, near Worksop, Notts; and the Judges of Pigeons—Mr. Hale, Handsworth; Mr. T. L. Parkes, Birmingham.

THE ANNUAL DINNER.

The dinner held at Dee's Hotel, on Tuesday, was attended by nearly a hundred gentlemen. Lord Leigh, president for the year, in the chair, supported by the Earl of Dartmouth, and having for his vice-presidents James Baldwin, Esq., the ex-Mayor, and William James, Esq. Amongst others present were Messrs. H. Luckcock, W. Matthews, W. Lucy, B. D. Webster, H. Workman (Mayor of Evesham), C. M. Caldecott, H. M. Griffiths, J. B. Hebbert, W. Wilson, M. Webster, C. Barnett, B. T. B. Gibbs, J. B. Simmonds, Rev. W. K. R. Bedford, Rev. W. Wingfield, J. Dawes (Smethwick), B. Bartlett, Leaver (Longnor), Moseley (Sandwell), Poundley, (Montgomeryshire), Heath (Norfolk), J. K. Baldwin, J. Ludlow, J. Mathews, Henry Wiggin, J. Lowe, J. Lakin, E. Freer, Corbet (London), C. W. Elkington, C. T. Nelson, J. Mier, Baily (London), Barford, John Moon, Philip Halse, Edwin Jones, W. H. Gem, R. L. Hunt, Hollingsworth (Bilston), Howard (Bedford), &c., &c.

After the usual loyal toasts, the Army and Navy, the Lords and Commons,

Mr. Wm. Mathews gave "The Agricultural and Manufacturing Interests." It happened to have been his lot to farm underground, instead of on the surface; and however conversant he might be as to the value of a strata of coal, or a measure of ironstone, and however easy for him to dilate upon the capacity of gateways, or log-work, and pillar-work, yet when he ascended to the surface, and began to deal with the things which constituted the raw materials of agriculture, then he felt that inability to grapple with the subject, which made him very diffident to discharge the duty. Still if a most profound respect for the agricultural interest, a most emphatic desire to see it succeed, a very great affection for all its pursuits, and a most hearty desire at some future period of his life to co-operate in those pursuits, constituted any claim on his part to give the toast, then he founded his claim upon as sure a foundation as any agriculturist in the room (cheers). In the early history of modern agriculture there was a delusion abroad as to the existence of some inevitable antagonism between commerce and agriculture. Fortunately this had been sent to that limbo to which all shams ought to go; and he thought that at that moment there did not exist a commercial or manufacturing man who did not hold agriculture in the highest possible respect, and did not wish every possible success to its pursuits (cheers). The time had now arrived when the narrow superficies of England was so subdivided that almost every person having any amount of taste and capital was looking forward to the period when he might participate in that pursuit which seemed natural to most Englishmen; and he, for one, should be sorry to see the time arrive when the taste for agriculture would be pushed aside by the more exciting but less pleasant pursuits of manufacturing life. At present they might feel satisfied that there was no nation in Europe which bestowed so much attention on agriculture as England; equally certain might they be that there was no nation which could have got up such an exhibition as the one they had that day witnessed in Bingley Hall.

Mr. John Lowe responded for the manufacturing, and Mr. C. M. Caldecot on behalf of the agricultural interest.

"The health of the President of the day, and also of the President elect"—Lord Dartmouth—followed. Then the "Exhibitors," acknowledged by Mr. Heath; and afterwards "The Judges," to which Mr. Baily, Mr. Chamberlain, and Mr. Meir severally replied.

Mr. Chamberlain said: The judges of cattle were very glad to see so great a number of good animals at this excellent show of stock. The gentleman who proposed "The Agricultural and Manufacturing Interest," has spoken highly in praise of the agriculturists; and he stated "that there was no nation in Europe which bestowed so much attention on agriculture as England." I was not sorry to hear him say so; because it has been very much the fashion, for some time, to detract from the merit which is due to the English farmers. And, I believe I may say, without fear of contradiction, and without giving cause of offence to any one, that owing to the skill, the judgment, the perseverance, the energy, and the attention of the English farmers and breeders, such herds of fine cattle—such flocks of beautiful sheep—such troops of valuable horses, for all purposes—and such droves of excellent pigs—cannot be produced by the whole world besides, as those which are produced by *many* of the farmers and breeders of "this great little island." One of the objects of this, and similar societies, is to stimulate a spirit of improvement, and to extend the breeding and feeding of animals of the best description, throughout the kingdom; animals which will supply the markets with the *cheapest* and *best* meat. I shall not notice the opinions of those persons who used to say, "We should do very well if a bushel of wheat were not grown in England." Neither shall I notice the advice which was given by gentlemen to the farmers at the time when the price of wheat was very low; viz., "Lay your land down to pasture, and do not grow so much wheat." I shall not notice the opinions which have been so expressed, or the advice which was so given. This is not the time and place to do so. But I may say to my brother farmers, make the land which you occupy produce as much corn and other food as you *possibly* can, for *the people of England have now to look to you for the bread which they eat*. And you will, I have no doubt, be anxious to supply their wants. Though, we know by experience, that after we have made every effort, and done all we can to produce good crops, we cannot ensure them. A great deal will depend upon the seasons. Too great a degree either of heat or cold—too much or too little rain—and many other causes, over which the farmers can have no control—may very seriously affect their produce. We also know that after a farm has been laid down to pasture, it takes some years to bring it into tillage, and a regular course of crops. For the compliment you have paid the judges of cattle I beg to thank you; and will leave the judges of sheep and pigs to answer for themselves.

Mr. Lakin gave, "The Royal Agricultural Society, the Smithfield Club, and the other Agricultural Societies in the United Kingdom."

Mr. Brandreth Gibbs, in responding, took the opportunity of expressing the pleasure he had felt on learning that this exhibition was not to be in future merely the resemblance of the Smithfield Club, but that it was intended to supply another want, a want which the Royal Agricultural Society had largely supplied—he referred to the establishment of an exhibition for breeding stock, as it was worthy of the energy which had characterised the origin of the Birmingham Show. If there was any district which, from a variety of circumstances, more than another, required such an Exhibition as that to which he had referred, it was Birmingham—easy of access, and with elements ensuring its success as completely as similar elements had combined to secure for its success in another particular—made it in fact the workshop of the world. He went on to express a hope that the alliance which had been so cordially cemented between England and France might lead to other useful and practical results: and he mentioned that a deputation from the Emperor of France had recently visited this country, to obtain information from the Royal Agricultural Society for the purposes of the Paris Exhibition of next year; that he had been deputed to give the information required, which he hoped might be of real service.

The Earl of Dartmouth proposed the health of a gentleman whom all who knew anything of the Birmingham Cattle Show would be delighted to honour. No man more completely appreciated the services of Mr. Wright than he did; that gentleman worked all through the year in behalf of the society; he regretted his absence, the more especially as that absence was occasioned by ill health; and he introduced his name and drank better health to him with the greatest pleasure. The toast was drunk very warmly.

Mr. Caldecott gave "The Vice-Chairmen, Mr. Baldwin and Mr. William James;" both of whom acknowledged the compliment.

Mr. William James then gave "The Ladies;" and Lord Leigh "Fox-hunting and the Master of the Cambridgeshire," to which Mr. Barnett returned thanks; and the meeting broke up.

HIGHLAND AGRICULTURAL SOCIETY'S WINTER SHOW AT GLASGOW.

JUDGES.

Of Cattle.—William Forrest, Treesbanks, Lanark; Robert Hardie, Harrietfield, Berwickshire; Thomas Nelson, Glasgow. Attending member: Robert Murdoch, Cranhill, Lanarkshire.

Sheep and Pigs.—John Archibald, Duddingston; John Bell, Glasgow; James Elliot, Lamberton, Berwickshire. Attending member: Peter Drew, Carmyle.

The premiums were awarded as follows:—

Best animal in the yard, prize of the Gold Medal, an ox (cross with short-horn), bred by James Miln, Rosehill, Arbroath, and belonging to Robert John Thomson, Hangingside. This animal got a prize at the last cattle show in Edinburgh. It competed this year in an older class.

CATTLE.

SHORT-HORN BREED.

Best ox, calved after 1st January, 1851, 10*l.*, Thomas Knowles, Aberdeen; 2nd, 5*l.*, Robert Elliot, Hardgrave, Lockerbie; 3rd, certificate of merit, Joseph Watson, Manor House, Woodhorn, Morpeth.

Best ox, calved after 1st January, 1852, 10*l.*, Robert Elliot, Hardgrave, Lockerbie; 2nd, 5*l.*, John Brodie, Abbey Mains, Haddington.

POLLED BREEDS.

Best ox, calved after 1st January, 1851, 10*l.*, William M'Combie, Tillyfour; 2nd, 5*l.*, William M'Combie, Tillyfour; 3rd, certificate of merit, Allan Pollok, Broom.

Best ox, calved after 1st January, 1852, 10*l.*, Alexander Bowie, Mains of Kelly, Arbroath; 2nd, 5*l.*, Wm. M'Combie, Tillyfour; 3rd, certificate of merit, Alexander Bowie, Mains of Kelly.

Best heifer, calved after 1st January, 1852, £6, James Steward, Aberdeen; second, £3, William M'Combie, Easter Skeene, Aberdeen.

HIGHLAND BREED.

Best ox, calved after 1st January, 1850, £10, Thomas Knowles, Aberdeen; second, £5, James Stewart, Aberdeen; third, certificate of merit, George Lumsden, Auquhorties, Keith Hall.

Best ox, calved after 1st January, 1851, £10, R. D. Campbell, of Jura; second, £5, R. D. Campbell, of Jura; third certificate of merit, Allan Pollok, Broom.

Best heifer, calved after 1st January, 1851, £6, John Alexander, Maine of Glammis; second, £3, James Stewart, Aberdeen.

ANY OTHER PURE BREED.

Best ox, of any age, £10, Sir Harry Verney, Windslow, Bucks; second, £5, James Stewart, Aberdeen.

Best heifer of any age, £6, James Stewart, Aberdeen.

CROSSES.

Best ox, calved after 1st January, 1851, £10, R. J. Thomson, Linlithgow (gold medal); second, £5, Allan Pollok, Broom; third, certificate of merit, William Stirling, M.P., of Keir.

Best ox, calved after 1st January, 1852, £10, John Brodie, Abbey Maine, Haddington; second, £5, Charles Lyall, Kincraig, Brechin; third, certificate of merit, James and William Martin, Aberdeen.

Best ox, calved after 1st January, 1853, £10, J. B. Wright, Hedderwick Hill, Dunbar; second, £5, David Wright, Gladsmuir; third, certificate of merit, Thomas Smith, Dalfibble, Dumfries.

Best heifer, calved after 1st January, 1851, £6, James Stewart, Aberdeen; second, £3, Thomas Knowles, Aberdeen; third, certificate of merit, James and W. Martin, Aberdeen.

Best heifer, calved after 1st January, 1852, £6, J. and W. Martin, Aberdeen; second, £3, Thomas Knowles, Aberdeen; third, certificate of merit, Thomas Knowles, Aberdeen.

Best heifer, calved after 1st January, 1853, £6, John Brodie, Abbey Mains; second and third, certificates of merits, ditto ditto. The judges highly commended a Highland ox, five years old, belonging to William Stirling, of Keir, M.P.

SHEEP.

LEICESTER BREED.

Best three wethers under two shear, £5, John Hunter, Dipple, Fochabers; second, £3, John Garland, Laurencekirk.

SOUTHDOWN BREED.

Best three wethers under three shear, £6, John Hutchison, Peterhead; second, £3, James Stewart, Aberdeen.

CHEVIOT BREED.

Best three wethers under three shear, £6, David Wallace, Leven; second, £3, David Wallace, Leven; third, certificate of merit, Duke of Buccleuch, Drumlanrig Castle.

BLACK-FACED BREED.

Best three wethers under four shear, £6, Andrew Wright, Corstorphine; second, £3, Andrew Wright, Corstorphine; third, certificate of merit, James Stewart, Aberdeen.

CROSSES.

Best three wethers under three shear, £6, Thomas Knowles Aberdeen; second, £3, Thomas Knowles, Aberdeen; third certificate of merit, John Hunter, Fochabers.

Best three wethers under two shear, £6, Lord Kinnaird, Rossie Priory; second, £3, Lord Kinnaird; third, certificate of merit, ditto.

EXTRA STOCK.

The judges commended two lots of black-faced wethers belonging to the Earl of Mansfield, Scone Palace.

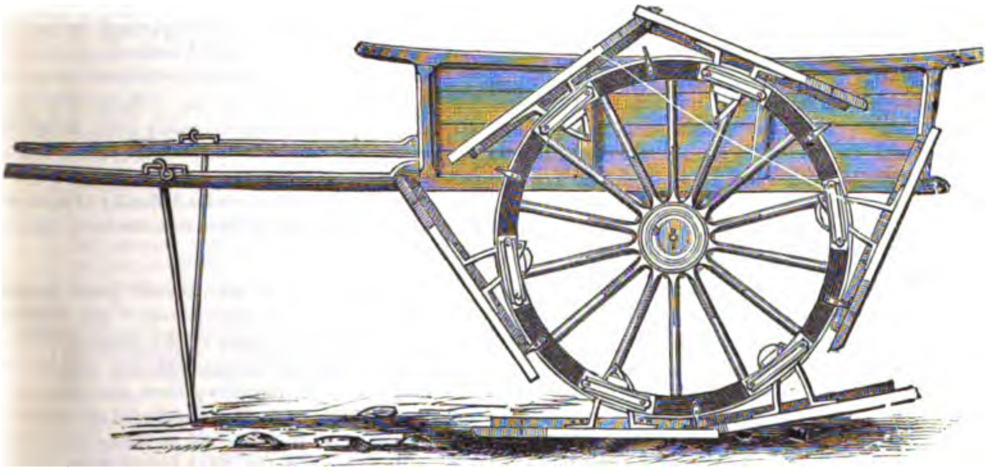
PIGS.

Best three pigs, not exceeding eight months old, £3, Geo. Hope, Fenton Barns; second, £2, Archd. Campbell of Blythswood; third, certificate of merit, Earl of Mansfield.

Best pig of any age, £5, Lord Kinnaird; second, £2, James Jackson, Eastwood, Pollokshaws; third, certificate of merit, Mr. Robert Shearer, Dalserf.

BOYDELL'S ENDLESS RAILWAY.

The carting of turnips and other edibles for sheep on grass lands during winter, more especially in the parks and park-farms of our large landed proprietors—getting out top-dressing upon the same—carting home turnips, where such have not been removed in autumn—the carrying in harvest off young seeds, and out manure in seed-time, when the land is soft from an excess of moisture, and many similar jobs, have long been experienced not only as injurious to the land, but a serious tear and wear upon horse-flesh and expense of manual labour—obstacles in the way of successful agriculture which Mr. Boydell's "Endless Railway" is intended to remove. They are obstacles, too, which Mr. Boydell himself has experienced during a period of upwards of twenty years' connection with agriculture and the management of landed property; and we are glad to perceive that he has at length succeeded, after much labour, time, and expense, in reducing his proposition of an endless railway on the periphery of a wheel, to successful practice. During the week of our Christmas Show, daily experiments were made at "Boydell and Glasier's Camden Works, London," with a cart fitted up with his patent apparatus, as also a wheel-barrow and another temporary machine, constructed to illustrate the principle by which a steam-plough or any similar implement may be propelled—to the general satisfaction of a numerous attendance of visitors. On that week we ourselves were too much engaged in the Bazaar to attend, but have since gone into the subject, and now propose giving a brief description and account of the whole, which we hope will not be unacceptable to our readers at this season of the year, when endless railways are so much wanted in every province.



The accompanying woodcut, from a drawing of the cart experimented upon, will very much abridge our labours in giving a description of Boydell's patent apparatus for cart and other wheels. It will be seen that there are six shoes, or longitudinal sleepers, on each of which is fixed a short iron rail, analogous in principle to the rails on some railways, where they are laid on continuous timber bearings throughout, so that each cart or waggon wheel is actually running on a rail—the same in principle to the wheels of a railway carriage, and without the objection to which the latter are subject by their tires being conical to prevent their flanges coming in contact with the rails. The length of the rails is of course always proportional to the circumference of the wheel, and of any shape which parties may desire. Those experimented upon were cubical; but we would prefer the surface on which the wheel acted so rounded that a stone would not rest upon it with the sides slanting outwards; so that the tire of the wheel in rolling forwards would press stones or any other hard material which might fall upon the rail out of its way. In other words, a triangular rail, with the vertical angle rounded off for the wheel to rotate upon, made of wood and shod with iron, or wholly of iron in various ways. The sleepers are considerably longer than the rails, projecting beyond them at each end on the alternate sides, forming a joint analogous to that of ship-building; so that, although the ends of the rails meet at the point of impact immediately under the wheel, yet the back and exterior projection, or *heel*, of the front sleeper, extends behind this point; while the front and interior projection of the back sleeper extends before it, thus forming a sleeper or bearing to the point of impact itself, which otherwise would be without. Such sleepers may be of any breadth, such, for instance, as to support a loaded cart through newly-ploughed lands if desired; or say, from six to fifteen inches, and are attached to the outside of the felloes by mechanical contrivances not so easily described.

A strong bar of iron is bent into the form of a very sharp-pointed or Gothic arch, and bolted to the sleeper with four strong bolts. At the top of the arch or bar will be observed a strong pivot analogous to that of the beam of a large balance. This bar works in a strong iron box, curved at the top, and having a groove at each side of the curve in which the pivot works when raising or lowering the railway from and to the ground. The curve of the two sides of the arch is cycloidal, always corresponding to the diameter of the wheel: in other words, the curve which each side of the bent bar forms, supposing it a line, is an arch of a cycloid formed by a point in the circumference of the wheel, in ascending and descending from and to the ground, and the length of each arch is such that when the two bottom sleepers are suspended freely from their respective pivots their rails will form tangents to the point where the line of direction of gravity of the wheel intersects the circumference, supposing the wheel elevated on a jack, or the point of impact, as represented in the drawing. The box again in which these cycloidal bars work is bolted to the felloes parallel to the tire of the wheel, and equidistant from each other. All these are very nice mathematical questions, which Mr. Boydell has had to observe in the reduction of his proposition to practice.

Wheels fitted up with endless rails are only adapted for slow motion, for if the centrifugal force exceeded that of gravitation the rails would not fall into their places; but, according to the patentee, "a wheel four feet six inches in diameter is calculated to work at any speed not exceeding four miles an hour," which is quite sufficient for all agricultural purposes.

The rails "can be attached to any wheel, and taken off at pleasure;" and as they greatly do away with jolting, they will consequently economise the tear and wear of carts, while the expense of their own repairs will be trifling.

The experiments performed at the Camden Works were, first, by drawing a cart loaded with two tons of iron over a soft surface by weights (1½ cwt.) attached to a rope over a pulley. This force drew the cart at a slow but increasing pace; and when another half-hundred weight was attached to the rope, the cart went off at the gallop, so to speak; in both cases analogous to similar experiments on a railway. Three hundred-weight, again, pulled the loaded cart through soft clay, in which the wheels would have sunk to the naves without the rails.

The second experiment performed was by drawing the empty cart over excavated pits like ditches, large heaps of bricks, blocks of timber from six to eighteen inches high, and in turning, so as to illustrate the manner in which the rails act as bridges and inclined planes—in going over ditches and elevated obstacles respectively—and also how they work in turning and in rolling along a slanting surface with the one wheel higher than the other; and the result, as in the last case, was highly satisfactory.

The third experiment was by loading a wheelbarrow with 7 cwt, without rails, when it sunk in the clay to the axle, and there remained fast. The common wheel was then taken out, and one with the patent apparatus put in, when the man went over the soft ground; thus proving in the most satisfactory manner the value of the endless rails to gardeners and others who have much wheeling in manuring lands, or in removing grass from lawns in wet weather.

The fourth and last experiment was to illustrate the manner of attaching the rails to the wheels of a portable engine, and of communicating motion to the same with sufficient power to plough land.

For this purpose two wheels with rails attached were fixed on an axle, in the centre of which was also fixed a large toothed wheel. This toothed wheel was driven by a small pinion, on each end of the axle of which was a crank, so that the wheels and rails were driven with considerable mechanical advantage. A frame was also fixed on the large axle, on the back part of which a man sat, who propelled the machine forward over blocks of wood and the soft clay ground with ease, by turning the small pinion with a crank in each hand. To test the power more satisfactorily, which he thus exercised, we attached 1 cwt. to the back of the machine by a chain, and although awkwardly situated for applying his strength, he yet drew the weights after him, ploughing up the ground several inches deep. Altogether the results in this case go far to authorise the patentee to say, as he does, that "attached to locomotive engines, they (the rails) entirely remove the difficulty of ploughing by steam," reducing the problem to a matter of time and money.

Besides the endless railway, patent gates, hurdles, fencing, green-houses, hand-glasses, and artificial basalt-stone may also be seen at the Camden Works. The gates, hurdles, and fencing, with the green-houses and handglasses under Boydell's patents, are highly meritorious and invaluable to the agricultural and horticultural interests, and therefore we earnestly recommend them to the notice of both. They involve the important principles of the greatest strength, cheapness, durability, and portability, while they are highly ornamental and simple to a proverb—qualifications which speak for themselves, exemplifying their own importance and value at first sight, to all who have any experience in rural affairs. The Government office of Public Works &c. is guilty in a national sense, if it does not use Boydell's hurdles, and fencing, in all our public parks, &c.

Messrs. Boydell and Glasier, we understand, are to exhibit these important improvements in operation every Monday, at least, during the present sitting of Parliament; and we beg most respectfully to recommend to the representatives of the agricultural interest in both houses, a visit to the Camden Works, Hawley Crescent, Camden Town, to judge for themselves. The first impression of the working of the endless rails may prove somewhat forbidding; but first impressions will soon be got over, in turnip-fields, grass-lands, parks, and pleasure-grounds; while they will find in Mr. Boydell (for many years a land agent) every anxiety to consult no less their interest than his own. As to terms, we may refer to Boydell and Glasier's advertisement, from which we are glad to perceive that they do not wish to interfere with the interest of wheel manufacturers, but the contrary.

ON THE CULTIVATION AND MANAGEMENT OF UNDERWOOD.

BY HENRY WOODS, MERTON, NORFOLK.

The management of underwood is a subject which at the very outset seems to present this difficulty, that, inasmuch as any one's experience must generally be confined to certain districts, it is possible that his system of management will only meet the requirement of localities similar to his own. But though this be so, it is easy, from a system of management which has been found to answer well in any particular district, to obtain instruction and hints which may be of great use in other parts of the country. Thus I think I shall be best carrying out this subject if I confine myself in my observations to the district in which the woods and plantations of which I have the management (comprising many hundred acres) are situated. And surely those interested in the subject will prefer information, however limited, drawn from actual experience, and with estimates copied from actual accounts, to an essay containing information not altogether so gained, and therefore in a measure necessarily speculative, or taken from books, or from the opinions of others. In giving an account of the plan followed here, I may first observe, that the underwood grown in the wood or plantation, from the accounts of which I shall now particularly give my statement, is an ancient wood of 70 acres. I shall, however, of course, give our system of preparing plantations of a similar kind. The subject will be divided into the following heads:—

1. The nature of the soil and mode of preparing it.
2. The average number of plants per acre.
3. The description of underwood growing.
4. The best sorts to plant.
5. The cost of fencing and draining.
6. The produce per acre.

1. The *nature of the soil* of this estate varies from a deep loamy soil with a clay substratum to a light blowing sandy soil with a gravel substratum. I consider that the average of the soil of the several plantations is of moderate strength, with a clay and marl substratum.

2. *The mode of preparing the land* is as follows:—I trench 18 inches deep. If the piece of land is of a large size, one party of men takes in hand one portion of the land; a second party of men begins where the other will finish, and takes an equal portion. The swards and soil thrown out by the second party in the first trench serve to fill up the last trench made by the first party, and so on with every fresh piece commenced. By this means the land is kept level. A trench is dug 20 inches wide, the sward is placed at the bottom of the trench, and the soil in being dug out to the depth of 18 inches is thrown on the swards and made level with the land previously done. The trench is worked from one side of the piece to the other. As the trenching is generally done by task work, and the overlooker cannot always be present, this simple and probably well-known method is adopted, by which it can easily be discovered if the work is properly done. I have 18 inches marked on a walking-stick, and by going over different parts of the work and pressing the stick through into the soil, I soon ascertain if the workmen have dug to the proper depth. For trenching the above depths my price is now sixpence and sevenpence per rod, or £4 and £4 13s. 4d. per acre; the workmen providing their own picks and spades. Should there be any part of the work where there are many stones or roots, I measure that part separately, and pay an extra price per rod.

I would observe that subsoil or trench ploughing has been here tried by the side of trenching, and although the plantation has been made some years, the difference is still remarkable, for the trees growing on the trenched land are much the largest and best grown; indeed, so superior has the system of trenching proved, that trench ploughing has never since been resorted to. It has also been particularly observed, that a large proportion of the larch and oak planted on the ploughed land die.

That great authority, the Duke of Portland, in a note to the article written on the system of planting and management of plantations at Welbeck, by J. E. Denison, Esq., M.P., published in the Royal Agricultural Society's Journal, vol. ix. part ii., states —"My first plantations in Birkland were on old sheepfolds, in 1821. It is probable the dung of the sheep had been scraped up or carried off, for the trees have grown very ill. In 1825, fourteen acres near it were followed by the plough, and sown with acorns. Between a part of this ground and a site of the old sheepfold, and close to the latter, there was a small bit of ground which could not be worked by the plough. As it was of no use there, and very full of twitch, it was digged three spades deep, merely with the view of burying the twitch, and planting with oaks. In 1847 I happened to see this ground, and I found that the oaks had far surpassed those planted before them; and judging that their great superiority arose from the quantity of soil in which their roots were able to work without obstruction, I have adopted the same principle in all the plantations made in the following winter, &c. &c."

I have had opportunities of seeing the plantations spoken of, and the difference in the size of the trees on the small piece of land is still remarkable.

The trenching is generally performed in the months of October and November, when there are usually many men out of employ. We plant as soon as possible afterwards. Early the following spring we set potatoes between the young plants; and by slightly earthing them in the early months of summer, the weeds are destroyed, and the surface being stirred allows the atmosphere to act beneficially on the roots of the young plants.

It may be objected that by the system of setting potatoes, the roots of the young plants may be injured.

I have positive proof that this is not the case; for the roots have made no progress when the potatoes are set, and even the first year they elongate but little. Besides, the potatoes are not set near the stems of the plants; there can therefore be no fear of the roots being injured the first year. It may also be thought that the land will be deteriorated by this system; but such is not the case even on the poorest soils, for I have had opportunities of comparing small portions of land that have been planted, but not set with potatoes; and the result is a decided conviction that the plan is beneficial to the land.

By reason of the fresh condition of the soil there is generally a good crop for the quantity of seed, and also considerably less disease than on highly manured lands. They are taken up with a fine bright clear skin, and are sold to the merchants in the neighbourhood, who generally send them to salesmen in London. I know by experience that this is a better plan than if the producers were to send direct to the salesmen; for when I so sent, my return was considerably less than I should have had even at home.

I particularly recommend procuring seed from the opposite kind of soil to that of the new plantation; for having two years ago procured some of the variety called York Regents from the clay lands of Lincolnshire, I found a material advantage in both the quantity and quality over the previous year; and this well compensated for the extra price of the seed and the carriage. I shall grow the same stock three years, and then procure fresh seed from the same heavy land.

The following is the cost of planting one acre with potatoes, and the average produce thereof:—

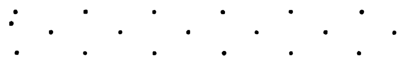
	£	s.	d.
12 bushels of seed potatoes	1	0	0
Expenses of setting	0	5	0
Ditto hoeing and earthing	0	3	0
Ditto taking up	0	8	0
Ditto carting home	0	10	0
Ditto of pitting, &c. &c.	0	2	0
Ditto carting to railway, coals being brought back	0	15	0
	3	3	0
140 bushels of potatoes, sold at 1s. 8d. .	11	13	4
40 ditto, small, ditto 1s. 0d. . . .	2	0	0
	13	13	4
Deduct expenses as above	3	3	0
Profit	10	10	4

To show further the advantage of planting potatoes, I subjoin a statement of expenses of forming a new plantation of twenty acres, lately made on some of the light land of this estate, and of the profit arising from the potatoes.

	£	s.	d.
244 rods of banking, 1s.	12	4	0
20 acres trenching, 93s. 4d. per acre . . .	93	6	8
20 ditto planting, 9s. per acre . . .	9	0	0
	114	10	8
20 acres of potatoes	210	0	0
Profit over expense of labour . . .	95	9	4

I do not advise growing a crop of potatoes the second year, as there would then be some risk of injuring the plants, and I believe an inferior crop of potatoes.

2. Before stating the *number of plants of underwood per acre* I must speak of the planting generally. Now many people place their plants thus—



in which case the plants stand in rows every way. But I prefer planting without any set rule of this kind; and by exercising ordinary care the plants are placed with sufficient regularity, make a better cover for game, and do not so soon show gaps if any plants die. The wind also does less injury to the plantation. And where plantations are made, as is generally the case, with the intention of improving the scenery, the formal system of planting cannot be too much condemned; for when larch, spruce, Scotch, or similar trees grow up, the lines will be more or less seen, and make that formal which should be natural and wild. For underwood, the number of plants is 4,000 per acre, and these on an average are three feet apart. It is desirable to state that we allow about 850 plants of oaks, larch, &c., per acre. After the pl[illegible]nded to form the underwood have stood three years, they [illegible] cut down to within three inches of the bottom; they then throw up strong shoots and grow up fit for use. The plants are raised from seed in a nursery on the estate, transplanted from a seed-bed into a compartment of the nursery, and taken from thence to the plantation. The cost of labour for planting an acre with the above number of 4,850 plants is 9s. The price of plants varies much with the demand; and I cannot do better than recommend an application to some of the many respectable nurserymen for a catalogue from which the price of every kind of plant may be obtained, and also, of course, the cost of sufficient for an acre.

3. *The description of underwood growing* in the 70-acre wood, which I spoke of as that wood from which my accounts would be taken, is hazel; with a portion of young ash-poles, shooting from the stumps of previously felled trees; which also, as I will presently show, are made profitable.

4. I can only, under this head, recommend hazel as *the best and most profitable to plant* for underwood; I have proved this by actual experience, but the profit can be better shown under the sixth head than here.

5. *The fencing* we use is simple and of easy construction, made at a trifling expense, and kept in repair for many years at a small outlay. The latter is a material point in any case, but more especially where planting is extensively done. It is simply a bank made from the sward, raised 4½ feet high, 2 feet wide at the bottom, and 1½ foot at the top. The sod is placed with the grass side outwards on both sides, forming the line of the bank; and, as each course of sods is placed, the middle is well filled up with loose soil, and rammed down hard with the handle of the spade. The top is beaten down with the back of the spade. The grass grows the following spring, and forms the whole into a solid mass. Furze is laid all along on the top of the bank, projecting five or six inches over the outside. This is placed in the following way:—Well covered or prickly furze is chosen, and carted, and laid in a row at the foot of the bank, outside the plantation; a man having his hands and arms well defended with leather gloves, takes up a bunch of the required size, and, having first placed the ends level, lays it on the bank with the stalks inwards. Another man is within the plantation, and places a sod on the top of the furze, which secures it perfectly. The men work backwards along the fence, so that every succeeding bunch of furze is laid on quicker and with less trouble. This fence is quite secure against the attacks of hares and rabbits for two years, and may be re-covered with furze, including cutting and laying, at the trifling cost of three halfpence per rod of 5½ yards.

For making a new bank, including cutting and laying (the furze is seldom distant enough to cost much for carting), I pay one shilling per rod as above. There are gateways left, if the plantation is large, in different parts of the bank. The gates are made with three bars, and boarded with narrow boards, nailed perpendicularly two inches apart from each other. Between the gate-posts a sill is placed, upon which the gate shuts closely. This prevents rabbits from working under.

Quick or other live fencing is generally planted within the bank, which grows rapidly and makes a good fence when the bank has decayed.

The land is not of the nature to require *draining*, neither if it were, should I think it advisable to describe the process or to estimate the cost; because of open draining almost every labourer knows enough; and the cost of such drainage would vary so much according to the position of the plantations and the nature of the soil, that no general rule could be laid down; and I consider that the advantages of tile draining any land intended for plantations are so very doubtful, that I should be unwilling to incur the expense; for instances have come under my own observation where drains, laid 9 feet deep, have been entirely choked by the fibrous roots of trees even standing at some distance; roots being powerfully attracted in their search for food by the water in the drains. And, therefore, I believe that tile draining in plantations, after a few years would become useless.

6. Having now given our system of preparing and planting the extensive plantations annually made, I will proceed to state the *management and produce;* and, as I said above, I will take as example the plantation of seventy acres.

This is divided into ten portions of seven acres each; which, as one portion is cut down every year, gives the underwood ten years' growth.

I may mention that, in making new plantations, they are so arranged as to size, that one entire plantation can be cut in one year, and so on with others, which keeps up the succession of fells.

I will now describe under separate heads the different articles which we produce, and for which we not only find a ready sale, but also are enabled to give employment to a portion of our surplus labour. I may just mention that the workmen begin to fell the underwood at the end of September.

HURDLES,

Commonly called wattled hurdles. For making these the most straight and best wood is selected. The young branches are neatly trimmed off with a hook, and the lower part of the strong wood is reserved for the stands or stakes to form the frame of the hurdle. The stakes are all cut to the length of three feet six inches, and pointed at one end. The two end-stakes are the strongest, about 1½ inch diameter. The stakes are fixed upright in a frame (which is fastened to the ground) with holes bored therein to receive the points of the stakes. In pointing the stakes, care is taken to make them of equal size, so that they pass the same distance into the holes of the frame. This brings them level on the top. There are nine stakes, set about 8½ inches apart. The hurdles are made seven feet long.

When the stakes are properly arranged, they commence to wattle the hurdle, beginning at the bottom and finishing at the top; binding all well together, which is done somewhat on the principle of basket making, though without being worked so close together. Hurdles are made during mild weather, as the wood will not work when very cold, being rendered so brittle that it breaks in the twisting. Many people make a rule of purchasing hurdles one year before they require them for use; which certainly is a good plan, as the hurdle stakes have had time to become seasoned, and so last longer. For making hurdles I pay twopence-halfpenny each, and sell them at eight-pence each. This wood is also used for making ornamental fences for gardens; the stakes are set in the ground, and the wood worked in the same manner as for hurdles. This fencing lasts several years.

EIGHT-FEET SPLINTS

Are also made from straight wood. The piece from which they are made is about 1½ inch thick and eight feet long. This is riven into two, and they are used for building and repairing walls here, called "stud, splint, and clay walls." These splints are sold in bunches of thirty split pieces. I pay the workmen twopence per bunch for riving, and sell them at one shilling per bunch.

SIX-FEET SPLINTS

Are similar to the above, but are made of smaller wood. They are sold in bunches like the eight-feet splints, and are used for similar purposes. The workmen receive the same price for riving, and they are sold at nine-pence per bunch.

BROACHES

Are known as long and short broaches. The long are used for thatching stacks, and the short for houses, barns, &c. They are three feet nine inches and two feet three inches long, and are riven from pieces not fit for hurdle stakes. The average number riven from one piece is about fifteen; these are tied up in bunches of 140 long, and 250 short ones; and are sold at ten-pence halfpenny per bundle, or three shillings and sixpence for four bundles, which are called a thousand. In bad weather these are riven in huts erected by the workmen. I pay fourteen-pence per thousand for preparing and riving.

It is worthy of remark, that the thatching of stacks where broaches are used for securing it, is most expeditiously and economically done, and stands well against wind. No tar line is required. The broaches are covered by every succeeding course of straw; rain is therefore less likely to penetrate than if pegs and tar line were used. A man will neatly thatch a stack of fifteen yards long in one day and a half, and the cost of the broaches will be about one shilling and nine-pence.

SWAYS

Are also required for thatching houses and premises, and are chiefly used with tar line for binding together the eaves and different parts of the roof. The tar line is fastened to the sway, and, passing round the spar and returning to the sway, is fastened a second time. These sways are four feet long, and are all the coarse pieces of the wood which are neither fit for making into hurdles, nor riving into broaches or splints. They average one inch in thickness. Sways are sold at sixpence per bunch of thirty, and the labour is two-pence ber bunch.

STRAW AND HAY BINS

Are made for and sold to farmers, who place them in their yards for the purpose of putting in hay, straw, &c., for cattle. They are made of the same kind of wood as hurdles. and in a similar way, except that they are round, being 4½ feet in diameter, and three feet high. I pay for making these ten-pence each, and sell them at two shillings and sixpence each.

POLES

Are ash growing from old stumps of trees. The branches are trimmed off and the poles sold to coopers for making hoops for casks. They are generally about twelve feet long, and two inches thick at the middle of the pole. They are sold at two-pence each. The labourers are paid one penny per dozen for throwing them out and trimming.

PEA-STICK FAGOTS

Are selected out of the branches trimmed off the hazels, and are sold to gardeners and others at three-pence per bunch. There are thirty in each bunch, and the price of labour is sixpence per score fagots.

BRUSH FAGOTS

Consist of all the small trimmings of the underwood. The fagots are about three feet six inches in circumference, and are sold to bakers and cottagers for oven wood, at three shillings and fourpence per score. The workmen are paid sixpence per score for tying.

BUSH FAGOTS

Consist of thorns growing among the underwood, and, being thrown aside when felling, are tied into small bundles, and sold to farmers for making fences, at one shilling and eight-pence per score fagots. The workmen are paid three-pence per score for tying.

CUTTINGS

Are the refuse ends of stakes, hurdle wood, &c., and are sold to cottagers for firewood, at two shillings for a one-horse cart load. The workmen are not paid anything for these.

I may mention in passing, that (if at any time the quantity of hazel grown should exceed the demand for it as now sold) during a journey (last year) to the manufacturing districts, I gained such information as proved to me that we could manufacture it profitably into bobbins; and, even at this distance, could by a moderate outlay for machinery, make an equal, if not a greater profit, than we make now.

I pay, in addition to the above prices, ten shillings per acre for felling. There is no expense in carting the produce sold. In every instance the purchaser carts from the wood.

The following is a copy from my books of one year's accounts to Michaelmas, 1851, for the seven acres; and I would mention that since the depression in agricultural produce, I have reduced my prices generally; and that this year (1851) being the worst fell in the wood, the profit is below the average.

PAID FOR MAKING	£	s.	d.
1,203 hurdles, 2½d. each	12	10	7½
140 bunches 8 feet splints, 2d.	1	3	4
19 ditto 6 feet ditto, 2d.	0	3	0
36,400 broaches, 1s. 2d. per 1000	21	4	8
94 bunches sways, 2d.	0	15	8
12 straw bins, 10d.	0	10	0
276 poles, 1d. per dozen	0	1	11
220 peastick fagots, 6d. por score	0	5	6
6,232 brush ditto, 6d. per ditto	7	15	9½
260 bush ditto, 3d. per ditto	0	3	3
Felling 7 acres at 10s. an acre	3	10	0
Amount paid for labour	48	3	9
Paid one year's tithe on entire wood of 70 acres	9	12	2
Four poor rates on ditto	4	19	0
One year's property tax on ditto	2	8	7
	£65	3	6
SOLD			
1,203 hurdles, at 8d. each	40	2	0
140 bunch 8 feet splints, 1s. per bunch	7	0	0
19 ditto, 6 feet ditto, 9d. ditto	0	14	3
36,400 broaches, at 3s. 6d. per thousand	63	14	0
94 bunches sways, 6d. per bunch	2	7	0
12 straw bins, 2s. 6d. each	1	10	0
276 poles, 2d. each	2	6	0
220 peastick fagots, 3d. each	2	15	0
6,232 brush ditto, 2d. each	51	18	8
260 bush ditte, 1d. each	1	1	8
Cuttings sold	1	2	9
	174	11	4
Deduct labour, &c., as above stated	65	3	6
Profit	109	7	10

It will be seen by the above statement that the tithe, rates, and property-tax on the entire wood of 70 acres are charged to the underwood on the seven acres, and no part to the timber which is annually felled on the same seven acres. So the produce gives us a clear profit of £15 12s. 6½d. per acre per annum on the fell of seven acres; or £1 11s. 3d. per acre per annum on the whole plantation of seventy acres.

In addition to the above, there is yearly gathered a considerable quantity of nuts, there being always forty-nine acres of wood old enough to produce them; but in consequence of these being gathered for seed for our nurseries, and no separate account kept of the cost of gathering, I am unable to show the annual profit. But the fact of its having, a few years ago, been let to a person for £1 per annum, who undertook for that small sum to keep out trespassers and take care of the wood at his own cost, clearly shows that there must be profit. Further, if we were to sacrifice timber-growing in the same plantation, in order to promote the better growth of the underwood, the produce would certainly be larger; but so far from that being the case, there is from each division (after the underwood has been felled) a quantity of valuable timber taken down. Several of the trees are of large dimensions, and, consequently, less underwood grows near them.

The following is the produce from timber taken from the same seven acres as the underwood:—

SOLD		£	s.	d.
Oak timber,	less labour	51	0	0
Ash ditto	ditto	14	5	0
Roundwood	ditto	5	10	0
Topwood	ditto	4	5	0
Bark	ditto	18	0	0
		93	0	0

In felling timber in this and other plantations care is taken to leave those trees which seem to promise to be most useful when the fell comes round again; and care is also taken to keep up the succession of oak, &c., by allowing sufficient spring seedling plants to stand. If we therefore add the amount produced from timber to that from the underwood, the profit on the seven acres' fell will be about £28 18s. 3d. per acre per annum, and £2 17s. 9¾d. per acre per annum for the entire plantation of seventy acres.

I have up to this time spoken only of the estate with which I am now connected; but I have had ample opportunities of seeing the management of other very extensive woods and plantations in Nottinghamshire, Lincolnshire, Derbyshire, and Yorkshire, and in no case, as far as I could ascertain, was the profit so large as that on this estate. One wood in Derbyshire (the most profitable I knew before I came here), of which the underwood is hazel, ash, and birch, now realizes £7 per acre, while ours, as has been shown above, realizes £15 12s. 6½d.

I know of a wood near London of which the underwood is said to produce more profit than ours; but this arises, of course, from the locality, and the great demand for fagots in London, into which this underwood is entirely converted. This, therefore, can be no guide as to the profit of underwood in other parts of England.

I have now endeavoured to show the way to make a plantation, so that the underwood shall produce a large profit, and yet that beauty shall not be sacrificed, inasmuch as the timber and the profit therefrom are not in any way neglected. I have described what I found to be the most profitable underwood to grow; I have given directions for, and the cost of, trenching, planting, fencing, &c.; I have shown how we manufacture our underwood, and described the purposes for which it is used, and the cost and profit of manufacture; I have proved that the expense (for labour) of making woods and plantations, with their fences, may be entirely paid by potatoes being planted the first year; that, up to the time when felling begins, the expense of keeping these plantations in order is but trifling; and that, after the first year's full, a considerable annual profit may be realized from the underwood and timber.

I would only state, in conclusion, that, from our being ten miles from a railway station or canal, from our great distance from any large town, and from the thinness of the population of this district, we may fairly say that the prices for our underwood are lower, and that our profits are less, than they might be in other localities. Nevertheless, I have shown a larger profit than I have known realized elsewhere. And thus it is plain, that, to landowners who wish to improve their estates both in value and beauty, no better plan can be recommended than that of planting portions of land, especially such as are sandy and unprofitable.

Make plantations, therefore, is my advice to country gentlemen, whether they agree with Butler's Knight, that—

> "The value of a thing
> Is as much money as 'twill bring;

or whether they so love woods and groves, and so feel their charm, as even to say with Virgil—

> "Nobis placeant ante omnia sylvæ."

Merton, March, 1853.

AVERAGE PRICE OF WHEAT.

SIR,—The present state of the corn market, and the great interest which is universally felt as to the probable supply and price of wheat during the coming year, induce me to transmit to you the annexed table of the average prices of wheat for each quarter from Michaelmas, 1845; also the annual average price to each Michaelmas-day, being the termination of what is usually called the farmer's year.* I have added the date and amount of the highest and lowest weekly average price during each of the respective years, in order that the extent of fluctuation may be seen.

At present, I merely wish to furnish you with the facts, and to point out some of the many causes, without reference to scarcity, which are constantly coming into operation, and which affect the price of grain, without attempting to account for the great fluctuations in price which occasionally have occurred. Among some of the more permanent causes, I may draw attention to the vast amount of gold which has been, and still continues to be, thrown into the world's treasury. Its effect will be slow, but very sure. The gradual enhancement of the market value of landed property, which has been remarked from time to time, although the rents may not have increased, shows that the rate of interest on money invested in the purchase of land is gradually decreasing, while the number of years' purchase of the net income is increasing. Although this may, perhaps, not be admitted as leading to the same result, I consider that such will be the case, notwithstanding the increased produce which may be obtained by the liberal employment of capital. To what extent the effects produced by these and other causes acting in the same direction may be neutralized, is a question of difficult solution. It may, however, be expected that the English market, now open to all the world, will induce those countries capable of increasing their produce to avail themselves of the advantages thus afforded to them; and it is not unlikely that, ultimately, the average price in England will be influenced and guided by the average market price of corn exporting countries, increased by the expenses of transit and the profit which the importer will add to the cost at the port of shipment.

I remain, sir, your obedient servant,

CHARLES M. WILLICH,

Actuary, University Life Office.

25, *Suffolk-street, Pall-mall, Nov.* 29.

QUARTERLY AND YEARLY AVERAGE PRICE OF WHEAT FROM MICHAELMAS 1845 TO MICHAELMAS 1854,

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* The annual average, as well as the septennial averages to the end of each year, have been already published, both in my "Popular Tables" and in the "Annual Supplement to the Tithe Commutation Tables."

TOGETHER WITH THE HIGHEST AND LOWEST WEEKLY AVERAGE IN EACH OF THE RESPECTIVE YEARS ENDING MICHAELMAS-DAY.

	s.	d.	Highest Price Week ending	Lowest Price Week ending
Quarter to Christmas, 1845	57	9	Nov. 1, 1845, 60s. 1d.	Aug. 14, 1846, 45s. 1d.
„ Lady-day, 1846	55	0		
„ Midsummer, 1846	54	7		
„ Michaelmas, 1846	49	2		
Year to Michaelmas, 1846	54	1		
Quarter to Christmas, 1846	59	9	May 29, 1847, 102s. 5d.	Sept. 18, 1847, 49s. 6d.
„ Lady-day, 1847	72	6		
„ Midsummer, 1847	85	10		
„ Michaelmas, 1847	67	1		
Year to Michaelmas, 1847	71	3		
Quarter to Christmas, 1847	53	6	Sept. 9, 1848, 56s. 10d.	June 17, 1848, 46s. 10d.
„ Lady-day, 1848	51	7		
„ Midsummer, 1848	48	11		
„ Michaelmas, 1848	51	8		
Year to Michaelmas, 1848	51	3		
Quarter to Christmas, 1848	50	4	Nov. 18, 1848, 52s. 2d.	Sept. 29, 1849, 41s. 9d.
„ Lady-day, 1849	45	5		
„ Midsummer, 1849	44	10		
„ Michaelmas, 1849	45	9		
Year to Michaelmas, 1849	46	7		
Quarter to Christmas, 1849	40	6	Aug. 10. 1850, 44s. 1d.	May 4, 1850, 36s. 11d.
„ Lady-day, 1850	38	11		
„ Midsummer, 1850	39	0		
„ Michaelmas, 1850	42	10		
Year to Michaelmas, 1850	40	3		
Quarter to Christmas, 1850	40	2	July 12, 1851, 42s. 8d.	Sept. 27, 1851, 36s. 7d.
„ Lady-day, 1851	37	7		
„ Midsummer, 1851	39	4		
„ Michaelmas, 1851	40	7		
Year to Michaelmas, 1851	39	5		
Quarter to Christmas, 1851	36	7	Sept. 4, 1852, 44s. 9d.	Oct. 11, 1851, 35s. 6d.
„ Lady-day, 1852	40	10		
„ Midsummer, 1852	40	10		
„ Michaelmas, 1852	41	2		
Year to Michaelmas, 1852	39	10		
Quarter to Christmas, 1852	40	5	Oct. 1, 1852, 59s. 5d.	Oct. 16, 1852, 37s. 10d.
„ Lady-day, 1853	45	7		
„ Midsummer, 1853	44	6		
„ Michaelmas, 1853	51	10		
Year to Michaelmas, 1853	45	7		
Quarter to Christmas, 1853	60	10	Jan. 28, 1854, 83s. 3d.	Sept. 16, 1854, 53s. 5d.
„ Lady-day, 1854	79	6		
„ Midsummer, 1854	78	4		
„ Michaelmas, 1854	63	10		
Year to Michaelmas, 1854	72	10		

REVIEW.

PLANS AND DESCRIPTIONS OF CROSSKILL'S PATENT PORTABLE RAILWAY, WITH ENGINEERS' REPORT. By JOSIAH PARKES, Esq.

Is a timely and well got up little work. The conviction is fast closing upon the agricultural world, home and colonial, that railroads of some kind or other must be brought to the assistance of this the present branch of industry, Mr. Crosskill has been labouring in the field for some time. The above talented engineer gives plans, with a description and report of his labours, including an experiment at Beverley, and we are but too proud of the opportunity of thanking both, and recommending this little work to our readers, to be had of Mr. Wm. Crosskill, Beverley.

The following are extracts :—

"The portability of this railway, and the ease with which it can be laid down either in curved or straight lines, are especially worthy of notice, and when made 4 feet 8 inches in gauge and in 10 feet lengths, a dozen labourers could fix it at the rate of half a mile a day.

"For Australia, our Indian colonies, and all countries in which roads are urgently wanted, and cannot be made on account of the scarcity of labour, this line cannot be too strongly recommended, on account of its simplicity and the ease with which it can be laid down, and its adaptation to an undulating country has been demonstrated by a trial of half a mile of it lately made near Beverley."

"The line submitted to my inspection at Beverley was 1000 yards in length; it was purposely laid down on a very irregular piece of ground, presenting very sharp curves and steep inclines, on the sides of two hills, having variable gradients from 1 to 15, to a short length nearly level. The carriages, loaded with two tons of iron, caused no disruption of the line in descending the steepest inclines at a high velocity; and the kind of break used enabled the man to stop the waggon in an extraordinary short space of time and length, upon the steepest declination."

"Mr. Crosskill has devised a plan of double rail, which will enable all common wheel carriages, made to proper gauge, to travel on the rail; by this means the rail is adapted to more numerous and important purposes, and even for military purposes, where there are no roads, as all army carriages, parks of artillery, &c., might be moved upon this line.

"The expense of the Railway will of course depend upon the size and strength required; but the approximate prices of these sizes are given below, as a guide to intending purchasers."

THE HARVEST HYMN.

God of the rolling year! to Thee
Our song shall rise, whose bounty pours,
In many a goodly gift, with free
And liberal hand, our autumn stores;
No firstlings of our flock we slay,
No soaring clouds of incense rise,
But on thy hallowed shrine we lay
Our grateful hearts in sacrifice.

Borne on thy breath, the lap of spring
Was heaped with many a blooming flower;
And smiling summer joyed to bring
The sunshine and the gentle shower;
And autumn's rich luxuriance now,
The ripening seed, the bursting shell,
The golden sheaf and laden bough,
The fulness of thy bounty tell.

No menial throng, in princely dome,
Here wait a titled lord's behest,
But many a fair and peaceful home
Hath won thy peaceful dove a guest;
No groves of palm our fields adorn,
No myrtle shades or orange bowers,
But rustling meads of golden corn,
And fields of waving grain, are ours.

Safe in thy care, the landscape o'er,
Our flocks and herds securely stray;
No tyrant master claims our store,
No ruthless robber rends away;
No fierce volcano's withering shower,
No fell simoom, with poisonous breath,
Nor burning sun, with baleful power,
Awake the fiery plagues of death.

And here shall rise our song to Thee,
Where lengthened vale and pastures lie,
And streams go singing wild and free,
Beneath a blue and smiling sky;
Where ne'er was reared a mortal throne,
Where crowned oppressors never trod,
Here at the throne of Heaven alone,
Shall man in reverence bow to God.

FARMERS' CLUBS.

The leisure season of the farmer, if he may be said to have such a time, will soon be here; and we again recur to the subject of neighbourhood agricultural associations, or farmers' clubs, because the topic is seasonable, and that we believe it one of importance to every rural community. Another year, with its results and its varied experiences, is now before the cultivators of farm and garden, and many a fact of practical value has been learned during that period. Different individuals, however, seem to turn over different leaves in the great volume of Nature, each reading a special lesson of her operations; hence, from the comparison of these experiences, much valuable knowledge may be added to the general as well as individual stock of information. This is the great object of the farmers' club, the formation of which we have, from time to time, attempted to advocate; we fear, however, with but small success.

Now, or at least as soon as the fall elections are past, is the time to organise these social meetings—well described in the designation above given, as farmers' clubs. Let the people of any rural neighbourhood—including, perhaps, the territory of two or three school districts—interested in the cultivation of the soil, meet either at the school-house, or the residence of one of their number, appoint a few officers, and agree upon a few simple rules for the regulation of their weekly or semi-monthly sessions, choosing also a subject which shall be discussed at their next meeting, or upon which some of their members shall be requested to prepare and read essays, and you have a farmers' club started. No difficulty will be found in the selection of themes, both interesting and profitable, in the cultivation of different crops, the best breeds and management of stock, &c., &c.; for there are numberless questions brought daily before every farmer, in which he is interested pecuniarily, and should be mentally, and which may be made profitable subjects of discussion. Here will be brought into use the experience of the past, and each may impart to the whole whatever he has learned, not generally known, or which may tend to confirm or confute the generally received opinions.

It may be thought best that each member pay a certain amount as an initiation fee to be applied to the purchase of agricultural books and periodicals, for the use of the club, and in this way, at a small expense to each, a large amount of reading could be secured to the whole. The many valuable papers now published would thus be brought before a wider circle of readers, and exert a still more powerful influence for agricultural and horticultural improvement. Many valuable books could thus be consulted by multitudes who would not be able otherwise to avail themselves of the privilege.

But the great object of these clubs, as we have said before, is the cultivation of the social faculties by the union of those like interests for their mutual advantage and improvement. There is no class or profession which makes less use of this principle of association than the farming, and none to which it can be of so much practical benefit. The knowledge of the best methods of cultivation, and all agricultural information, is derived mainly from experience, and new facts are constantly coming before the eyes of every intelligent and observing farmer. These facts are of just as great value to his neighbour as himself; and the neighbour, on the other hand, may have learned something of equal interest. The interchange of the results of observation and experiment is what gives agricultural papers their value; and these societies, though in a narrower range, all tend to the same end. The results of the experience of the individual farmers of a neighbourhood may be made general property to the advantage of the whole, as the experience of the best farmers of the country is made the general property of its readers, and a furtherance to the public interest, by publication in an agricultural journal. So also are farmers socially united, as they find mutual profit from such interchange of information and courtesy.

We think it will always be found profitable to have the subjects of discussion known beforehand, as the members will come better prepared to give brief statements of their knowledge of the matter, though the remarks at the time will very likely call out facts not particularly thought of previously, but none the less valuable on that account. And there are few if any neighbourhoods where there are not several persons well qualified to prepare essays on subjects of interest, presenting in a condensed form the results of experimental and scientific research thereupon. And the existence of a Farmers' Club will incite to the trial of new experiments on doubtful questions in farming economy, and more careful observation of the varied operations and phenomena of Nature.

A more extended public interest may be given by occasional lectures by competent persons from abroad, by gatherings more exclusively social in which the ladies take a larger share; and experience will suggest many ways to give lively interest and large usefulness to the Farmers' Club, making it one of the most important agencies in improving the minds and farms of every neighbourhood in which they go into operation. Such, indeed, has already been their effect in many instances, and we hope they will become more numerous and more useful until every farmer is awake to the importance, and active in the dissemination, of the knowledge which tends to progress and improvement in agriculture.—B.—*Rural New-Yorker.*

VALUE OF CARROTS FOR MILK COWS.—I have tried feeding carrots to milk cows, and will give you one of my experiments. I have (April 15th) seven cows in milk—one calved in June, the rest in September and October. I raised eighty bushels rutabagas and four hundred bushels carrots, and fed them to my cows, commencing the first of December. I gave them about 2½ bushels per day, at noon, the rutabagas first, and when they were all fed out, the same quantity of carrots. I found, when I had fed the latter a few days, that my cows were each giving from two to three pints of milk more per day, than when fed on rutabagas. I was feeding my cows, meanwhile, with cut hay, and 2 lbs. oilcake and meal, and 2½ lbs. wheat screenings, ground. The thought struck me that I should like to know the value of carrots for making milk, so I selected the cow that calved last for the trial. I weighed the hay, meal, and carrots, and fed perhaps 27 lbs. of hay, 4½ lbs. of mixed meal, and 22 lbs. of carrots, and she gave 35 lbs. of milk per day. I then left off the carrots and gave the same amount of meal, and all the hay she would eat, which was 33 lbs. per day. After feeding so for a week, I found she gave 23 lbs. of milk per day. I then gave her the carrots as before, and in eight or ten days she came up again to 35 lbs. for milk per day. This shows that carrots are worth to me to feed cows 82 cents per 100 lbs. Hay is worth 20 dollars per ton in the barn, and at 3 cents per quart, or one cent per pound for milk; 6 lbs, less hay, and 12 lbs. more milk gives 18 cents for 22 lbs. of carrots. My carrots are all gone now, or I would try one or two more cows. Next winter I hope to have another opportunity for experiment.—Abner Haven, Rural New-Yorker.

ON MAKING PROVISION FOR THE DECAYED AND INDIGENT FARMER.

I make no apology for introducing this subject into your columns at this season of the year. Christmas is that peculiar time when all hearts are opened to every generous emotion—when our charitable sympathies are most awakened—when all purposes of benevolence are examined and most acceptably entered into. It is this most appropriate season that I have chosen to bring before the British public, and more particularly the agricultural part thereof, a *scheme of charity* of a very extensive and highly benevolent character, and one which is yet wanting amongst the many great and patriotic institutions which ennoble and adorn our country, and are designed to mitigate the woes and relieve the necessities incident to our common humanity.

My object, then, is to establish an *Institution* for the relief and permanent support of the *unfortunate decayed and indigent farmer.*

It is much to be regretted that no institution of a public character has yet been established for the above purpose. It is a blot on the page of the history of our charities, and reflects seriously upon the landed gentry and farmers of our otherwise provident and generous country. That noble patron of British agriculture, the Duke of Richmond, has set an example worthy of all praise, in appropriating the spontaneous offerings of a grateful yeomanry to him, as a testimonial of his untiring zeal in promoting agricultural progress, to the relief of indigent farmers, and in providing homes for the homeless. Shall such an example be lost? I trust that at the present juncture a large and general movement may take place worthy of the great country in which we live, and of the extended sphere of usefulness opened out to us. The aspect of the times greatly favours such a project: almost every kind of farm produce is highly remunerative. Gratitude becomes in an eminent degree the duty of the farmer; be it now exercised. Who does not call to mind cases of indigence he would be glad to relieve—cases calling forth the warmest feelings of his heart—cases, it may be, of parents ruined by reckless children—cases of misfortune; fire, mildew, blight, drought, flooding; or of murrain, rot, pleuro-pneumonia; or, again, of pecuniary losses—in fact, any of the innumerable ways by which distress and poverty come upon the unfortunate farmer? These do, and will, call forth the kindest sympathies of every generous heart. I therefore do most urgently commend this subject to the calm consideration of every benevolent mind, and I trust that this grand desideratum will be at once supplied to the needy and meritorious class for whom I plead, and that the institution itself may prove an invaluable addition to our country's plans and objects of benevolence.

My plan is, to organize a society after the order of one of our public societies, having its president, vice-presidents, treasurer, secretary, and committee of management, &c.

That they proceed to raise a fund by such ways and means as seems to them most advantageous and effectual.

That the fund so raised shall be appropriated to the relief of needy and broken-down farmers or their families.

That an asylum be provided for the houseless, that those who may be elected to the benefits of the institution may have the advantage of a home if they desire it.

That for the present a suitable residence, with a small farm, be hired on lease for the above purpose.

That assistance may be given to non-residents who are elected to be recipients of the benefits of the institution if they prefer so to receive it.

That the mode of election be vested in the members, as in similar societies; and such election take place periodically.

That for the present no candidate shall be eligible till he has attained the age of sixty years.

These, with some minor matters, will be the chief objects to be kept in view.

The first thing to be done is to hold a public meeting in London for organizing the society; and as the session of Parliament is now holding, no time is more fitted for that purpose than the present.

Various suggestions might be made as to the mode of raising funds. One that has struck me forcibly is, that a collection should be annually made at every Christmas market dinner throughout the kingdom. As soon as the necessary funds appear to be forthcoming, it might be desirable to commence the building of a suitable asylum, which, I think, should be large enough to contain 300 inmates; and if a small farm was attached, all the better, as forming a congenial employment for the old ex-farmers. In the meantime some eligible place might be hired, such as an unoccupied gentleman's residence, or otherwise equally convertible building. At the laying of the foundation stone of the Idiot Asylum at Redhill, in June, 1853, nearly £10,000 was raised! May not a similar sum be realized on the like occasion for this society, supported, as it ought to be, by the aristocracy, gentry, and yeomanry of the country? P. F.

COATES' HERD BOOK.

While on a northern tour, now many years ago, we remember well our staying at Northallerton during the Show of the Yorkshire Agricultural Society, which we found in course of preparatory arrangement; and, in the hope of seeing as much of the exhibition as possible, we rose early in the morning to witness the opening of the Show-yard.

On our arrival there, before 6 o'clock A.M., we were not a little surprised to meet the late lamented Earl Spencer, the President of the Society, with whom we had had the pleasure of dining the day before, passing with him and other of the leading members of the Society one of the most agreeable evenings we ever remember to have enjoyed at a local agricultural show. Thus early in the morning, nevertheless, did we witness the deep personal interest Earl Spencer manifested in maturing the arrangements of the Show-yard in the best manner possible for the convenience of the exhibitors, but more particularly for the comfort and accommodation of the stock intended for exhibition. The morning was favourable for the purpose, being all that could be desired for a show day, and his Lordship appeared to be in the enjoyment of a treat that reminded us rather of the pleasures of a much younger man, than of one who had already held the important office of an English Chancellor of the Exchequer.

The breeding and rearing of stock, however, particularly the shorthorned breed of cattle, constituted no small share of his Lordship's pleasure and amusement—so much so, that his most agreeable recreation from the cares of public life appeared to centre in the gratification afforded by close personal inspection of the progress this distinguished breed of cattle was making under his own care and management. The profound attention displayed by his Lordship may be inferred from the fact of his keeping a record of the pedigrees himself, beyond that entrusted to others; while the deep interest he felt in securing a proper successor to the late Mr. Coates will not speedily be forgotten—one who would faithfully chronicle in the subsequent volumes of the Herd Book the true pedigrees of short-horned cattle—a breed too widely celebrated at home and abroad, and too well-known in our colonies, to need any eulogium here. The judgment of his Lordship as a breeder, however, was not sounder than the record he has left behind him of the individual who was, in his estimation, best qualified for the onerous and important duties that awaited him, or any one else who might have had committed to his charge the important task of properly editing the Herd Book. In a letter placed before us, the other day, in his Lordship's own handwriting, we read that to Mr. Henry Strafford, the present editor and proprietor of that invaluable record to the shorthorn breeder, did he express his belief in his fitness for the office, coupled with the admiration of his character, for the liberality he had manifested in his arrangements with the predecessors in those labours for the advancement of well-bred stock, the late Messrs. Coates.

That an English nobleman, possessing the high character for integrity which men of all shades of opinion in politics awarded him, should have left for posterity such unquestionable testimony as we have here referred to, is no small matter of commendation for the present editor. And although the breeders of shorthorns as a body have not supported the "Herd Book" to the extent that it was unquestionably their true interest to have done, still it is, nevertheless, somewhat satisfactory to learn that many of them have proved they know how to appreciate and reward the care and toil incidental to the production of so massive and important a work. We say nothing of the enormous outlay which has been entailed in printing the late volumes that have already appeared, at a cost approaching three thousand pounds, and on which, so far as the profit to Mr. Strafford is concerned, we believe we are correct in saying, that he has never been even fairly remunerated for his outlay, leaving alone any consideration for the labour and care of editorship.

Our attention has been drawn to this subject by an advertisement which appeared in our columns the other day, announcing for press a new volume of the "Herd Book," with pedigrees brought down to December 31st, 1854, which will shortly be published; and in directing the attention of such of the breeders of shorthorns as have not yet united to support the publication of the "Herd Book" at regular intervals, we tell them that they stand in their own light—that they are blind to their own interest—and, further, that such a course is subversive of their own commonwealth.

What, we ask, can prove half so assuring or profitable to the breeder of shorthorns as the wide-spread chronicles of his herd? What secured for the "mighty dead" the celebrity of their herds; for the Wiseton stock its high character; for Bates' blood its renown; or for the Tortworth Herd its reputation? We leave others to answer; but this we do say, fearlessly and conscientiously, that no blow could be inflicted so heavily against the best interests of the shorthorn breeder as the decay of this chronicle—the downfall of this "*Herd Book.*"

With the unreserved opinion herein expressed we conclude our notice of the forthcoming volume of the Herd Book, believing as we do, with the knowledge we bring to bear upon the subject, that it behoves the shorthorn breeders of the country to secure, by their support, its continuous publication, as the only standard work of the kind, the real value of which, in very many instances, we fear, is but too likely to be appreciated only when the expenditure in its production may be no longer borne by Mr. Strafford, who has hitherto conducted it with so much ability, satisfaction to the country, and credit to himself, and who is the sole proprietor.

AGRICULTURAL QUERIES.

SIR,—Will you be so kind as, through the medium of your widely-circulated paper, to obtain me a little information respecting steam-engines, viz., would there be any material difference in the consumption of fuel and water were I to substitute a high pressure engine with double cylinder instead of one with single cylinder?—in fact, which of the two would be preferable (twenty-horse power) for driving flour mills, fuel and water being the greatest considerations?

Perhaps some engineer will give his practical opinion, which will greatly oblige

Dec. 9th, 1854. A YOUNG MILLER.

SIR,—I should feel obliged if any of your numerous readers would point me out, in your journal, the best method of planting apple trees on poor land with a subsoil of very strong retentive clay. I am, sir, yours respectfully,

A LANDOWNER.

[Unproductive lands for aration and pasture sometimes prove the contrary under an orchard; but the case is rather an exception than the rule, so that caution is necessary before expenses are incurred. We should have liked to have known something about geological and meteorological circumstances. In the absence of information of this kind our advice must be of a very general character. Efficient drainage is absolutely necessary to success under every circumstance. If the subsoil is sound, trench twenty inches deep—and now is the time to get the benefit of the spring frosts; if otherwise, only loosen the subsoil, making as much provision as possible for the washing of poisonous salts into the drains, so as eventually to purify the soil and preserve the health of your trees when they acquire age. And in many cases it is found to pay to put a small load of brickbats, broken tiles, flags, &c., under each tree, in order to prevent the roots from sinking into the poisonous subsoil. With regard to manure, apple-trees like a rich soil, but not of that quality which will force forward luxuriance of wood; indeed, active manures of this latter sort must be carefully avoided. If you have got a deep bank of gravelly earth rich in vegetable matter, a cart-load to each tree would likely place your young orchard in a fair way of prosperity. If you intend your orchard to lie in grass, top-dressings of liquid or solid manure frequently applied is the best plan of securing a healthy close sward. A top-dressing of lime and earth will sometimes neutralise injurious salts where trenched to the surface.—ED. M.L.E.]

SIR,—I should be glad if some of your numerous practical correspondents would state their opinions on the disease in cattle known under the different names of the "Black Shawa," "Black Blast," or "Black Quarter." It has been making great ravages on a farm in my neighbourhood, attacking indiscriminately calves, year-olds, and stall-feeding cattle, carrying them off in from five to twelve hours. Most people seem to agree as to the impossibility of effecting a cure when the disease has set in. The only question seems to be, what can be done in the way of prevention? and what course ought to be taken as regards the remainder of the cattle when the disease has broken out in a stock? ENQUIRER.

[The complaint with which your stock are seized is inflammatory fever, terminating in some local part, as the hind-quarter. The difficulty of cure lies in discovering the first symptoms of inflammation, and its epidemic character in the general state of blood. Like all other inflammatory complaints, timely bleeding and physic (Epsom salts) constitute the remedy. With regard to the concluding question, we have always found a dose of Epsom salts to "the remainder of the cattle" an effective prevention, followed by a small dose of sulphur where the bowels required it, taking care at the same time not to give more succulent food than the system is able to dispose of properly. When the malady assumes an epidemic form, its cause is very interesting; and therefore we should have liked to have heard how the cattle were fed and managed for some time previous to its appearance. Information of this kind is necessary to enable any of our correspondents to discuss the subject practically. —ED. M.L.E.]

SIR,—I sowed about 10 acres of rapeseed last August 30, and Sept. 2 and 18; present height from 2 to 10 inches. May I ask some of the valuable correspondents of the *Mark Lane Express* to inform me if I ought to calculate upon any sheep-keep worth notice in next April or May? The plant is now rather healthy; new raw land, limed and manured, as also recently drained. SEEK KNOWLEDGE.

ON SUPPLYING SALT TO SHEEP.

SIR,—Notwithstanding the positive benefit arising to sheep, yet, without looking far, I see the sad effects of their not being constantly supplied with salt.

In my fields, a box containing a few pounds is, on the removal of the flock, always carried with them into the field. The consequence is, that a diseased liver or foot is not to be found.

Lately the question of foot-rot was disputed. In order to prove the effect of depriving the animals of salt, on my separating my breeding flock from the lambs, &c., I found three riggs. These I placed in meadows apart, and went from home for a few weeks. On my return, I found them feeding on their knees with the foot-rot.

I send you this statement, should you consider it worth notice, that you may publish it; but as many statements are made without name, in order that this may be by any one in passing verified, I subscribe myself

Your constant reader,

J. FORBES.

Winkfield-place, Windsor, Forest, Dec. 15.

P.S.—The salt costs about 8s. to 10s. per annum.

ADULTERATED GUANO.—The vast quantities of mills and works erected, where thousands of tons of burnt clay, half-burnt tiles, and other materials, are mixed and despatched to Liverpool to be sold and palmed upon farmers, is really astonishing. These manufacturers have men going regularly buying old Peruvian-guano bags with their real smell, and they probably mix one, two, or three hundred-weight of guano to the ton; and it is sold, for £11 and £12, as genuine. And so it is that our Lancashire, and even Cheshire and Yorkshire, farmers are gulled and robbed. There are several other manufactories and works in bye and secluded districts where parties are making and passing out what they choose to call artificial fertilizers, which are nothing more or less than bare-faced and adulterated robberies. There are parties who have tried all sorts and prices of manures, and none can compete with raw bones or superphosphate of lime in price and quality; these articles are pure. Indeed the deception in the manure-trade now loudly calls for the protection of, and suppression by, the authorities. These are facts which cannot be too widely circulated.—A DUPED FARMER.

METEOROLOGICAL DIARY.

BAROMETER.			THERMOMETER.			WIND AND STATE.		ATMOSPHERE.			WEAT'R.
1854.	8 a.m. in. cts.	10p.m. in. cts.	Min.	Max.	10p.m.	Direction.	Force.	8 a.m.	2 p.m.	10p.m.	
Nov.21	29.91	29.25	34	43	43	S. S. W.	lively	cloudy	cloudy	cloudy	rainy ni.
22	29.01	28.95	34	38	32	N. West	lively	fine	cloudy	fine	dry
23	29.00	29.08	30	42	28	Variable	calm	fine	haze	fine	dry
24	29.14	29.25	27	39	32½	Variable, N.W.	var.	haze	cloudy	fine	dry
25	29.44	29.64	31	38	36	N. by East	gentle	cloudy	cloudy	cloudy	hail
26	29.79	29.90	29	35	34	N. by East	airy	haze	cloudy	cloudy	rain
27	29.93	29.86	27	33	33	N. by E., var.	calm	fog	fog	clear	rain
28	29.73	29.44	32	45	45	Variable, N.	brisk	cloudy	cloudy	cloudy	rain
29	29.12	29.22	44	48	40	Variable, N.	brisk	fine	fine	fine	showery
30	29.47	29.20	34	49	49	Westerly	brisk	fine	sun	cloudy	rain
Dec. 1	29.44	29.80	39	46	38	N. Westerly	airy	fine	cloudy	fine	dry
2	29.80	30.02	38	41	40	N. Westerly	fresh	fine	fine	fine	dry
3	29.99	29.80	38	48	48	West by North	strong	fine	fine	cloudy	showery
4	29.96	30.00	43	49	43	West by North	brisk	fine	sun	cloudy	dry
5	29.66	29.37	43	47	40	S. West	lively	cloudy	cloudy	cloudy	showery
6	29.37	29.70	35	43	39	N. West	gentle	fine	sun	fine	dry
7	30.07	30.16	32	40	30	N. West	gentle	fine	sun	fine	dry
8	29.90	29.60	28	48	40	W. S. W.	airy	cloudy	cloudy	cloudy	drizzle
9	29.41	29.60	40	43	36	N. by W.	brisk	cloudy	fine	cloudy	rain
10	29.77	30.03	30	37	29	N. by W.	lively	cloudy	fine	fine	dry
11	30.05	29.94	25	48	41	S. West, var.	lively	fine	cloudy	cloudy	dry
12	30.07	30.11	36	42	38	S. West	lively	fine	sun	fine	dry
13	30.20	30.04	38	51	50	S. West	strong	cloudy	cloudy	cloudy	showery
14	29.94	30.05	49	53	52	S. W., W.	brisk	cloudy	cloudy	fine	drizzle
15	30.07	29.90	50	52	51	W. by S.	forcibl.	cloudy	cloudy	cloudy	dry
16	29.71	29.92	43	47	37	W., N. W.	airy	fine	sun	fine	dry
17	29.96	29.77	33	42	40	Westerly	fresh	fine	sun	cloudy	dry
18	30.08	29.50	38	38	33	N. by W.	strong	cloudy	cloudy	fine	rainy ni.
19	29.92	29.40	24	36	38	N. by W., S.	airy	fine	sun	cloudy	rain
20	29.44	30.00	37	40	36	North	strong	cloudy	cloudy	fine	rain
21	30.11	30.00	30	49	48	S. West	brisk	fine	cloudy	cloudy	rain

ESTIMATED AVERAGES OF DECEMBER.

Barometer.		Thermometer.		
Highest	Lowest.	High.	Low.	Mean.
30.32	29.12	55	17	39.3

REAL AVERAGE TEMPERATURE OF THE PERIOD.

Highest.	Lowest.	Mean.
43.55	35.2	39.375

WEATHER AND PHENOMENA.

November 21. Several hours' rain. 22. Very cold; frost evening. 24. Frost; some sleet. 25. Drizzly night. 26. Haze and rime; thaw. 27. Frost and rain. 28. Rainy afternoon. 29. Clearing; heavy clouds; a lunar halo. 30. Beautiful day; change to rain.

LUNATION.—Last quarter, 27th day, 2h. 40m. morning.

December 1. Fine; drying. 2. Pale lunar halo at night. 3. Strong current; a little sun. 4. Gorgeous sunset—green and orange stripes. 5. Overcast; high wind. 6. Cool and cheerful. 7. Frosty, rime, and ice. 8. Remarkable change of temperature. 9. Cold; fine gleams. 10. Another frost, with rime and ice. 11. Again a mild change. 14. Damp, warm, and windy. 15. Drying and wind; lull at night. 16. Quite changeable. 17. Fine lively day. 18. Fierce wind, after a wet night. 19. Strongest frost rapidly giving way; wet at ten. 20. Wet, cold morning; lull and clearing at night. 21. Several hours' close rain, again after frost.

LUNATIONS.—Full Moon on the 4th day, 1 h. 34 m., p.m. Last quarter, 12th day, 6 h. 11 m., p.m. New Moon, 19th day, 9 h. 47 m., p.m.

REMARKS CONNECTED WITH AGRICULTURE.—Every prospect appears to me to be highly favourable. Wheat is looking neither too full nor deficient in plant. Verdure advances as a natural consequence of the seasonable and frequent rains. There have been few of the winter elements; and as every short visitation of frost has been succeeded by wind, rain, and mild temperature, I venture to surmise that such will be the character of the winter. This day the sun passes into the sign Capricorn, and astronomical winter begins.

Croydon, Dec. 22. J. TOWERS.

AGRICULTURAL REPORTS.

GENERAL AGRICULTURAL REPORT FOR DECEMBER.

The continued high price of grain, especially of wheat, and the prospect of our importing increased supplies to meet extra consumption between this and the middle of next year, have formed the leading topics of conversation and discussion since we last wrote. The extent of the last harvest has, too, been canvassed; and upon that point a great difference of opinion has prevailed. No doubt, in some localities, a very large portion of the new crop of wheat has been thrashed out and passed into consumption; but taking the country generally, we are decidedly of opinion that the extent of the transactions has been over-estimated so far as their effect upon price is likely to be concerned. That we have a very large supply of home-grown wheat still on hand—and that, too, in the finest possible condition—does not admit of a doubt. And a most fortunate circumstance this is for the country, engaged as we are in a long war, and with the bulk of foreign importations cut off. But, when we find that the weekly sales of wheat keep up to a very high point compared with most former years, and, further, that the sales must of necessity be large to keep pace with our wants, it becomes a serious matter to consider whether or not prices have yet reached their highest point. Of course, much will depend upon the period to which the present struggle is continued; but, should it be prolonged during the whole of 1855, and should our prospects of imports from the United States not improve in the meantime, it is impossible to foresee the extent in the range of prices. No doubt, supplies of foreign grain will continue to reach us; and it is possible that our wants may be met: nevertheless, the present features of the trade plainly indicate firmness in price, combined with a large consumptive demand.

Most out-door farm labours have progressed rapidly, with very few interruptions. And it is gratifying to be able to observe that a very large breadth of land has been laid down for wheat—if anything, in excess of last year; and that the growers have been stimulated in their exertions by the present state of our markets. Notwithstanding the enormous amount of emigration and the wants of the army, labour has been tolerably plentiful; and we have observed a growing feeling in favour of higher wages and greater comforts amongst the agricultural classes. The young wheats are looking remarkably well, and the ravages of the slug have been checked by the fine frosts, which, however have been less severe than in some former, seasons.

The produce of the barley crop is turning out large; but there is evidently a want of fine malting samples. This kind of barley is, therefore, likely to command relatively high prices during the remainder of the season. Oats are a fair average crop; but both beans and peas, on being thrashed out, show a great deficiency.

Although potatoes have advanced in price, the supplies of that esculent disposed of have been extensive. Growers, almost generally, admit that the growth has proved larger and of better quality than they had anticipated. As we shall, no doubt, be well supplied with potatoes for a considerable period, the upward movement in the value of wheat may be thereby checked; yet it is a question—seeing that very few foreign potatoes are likely to reach us—whether English potatoes will not further improve in value. The shipments from Ireland have not been to the same extent as in 1853; but those from Scotland have shown a large excess, and the arrivals per railway into the metropolis have been considerably in excess of most former years.

The markets for the sale of fat stock have been tolerably well, but not to say extensively, supplied for the time of year. A full average business has been transacted in them, and prices generally have ruled very high. Hay and straw have changed hands steadily; but the latter article, arising from the greatly increased supplies on sale, has given way in price—the quotations having ranged from £1 4s. to £1 11s. per load. These prices are lower than for the last two years. Meadow hay has sold at £2 15s. to £4 15s; and clover ditto, £3 to £6 per load.

The manure markets have been in a healthy state. The whole of the imported guano has sold at high rates. It is to be much regretted that this article is still sold under a monopoly; but we fear that the efforts commenced last year to open the trade have not been followed up with sufficient energy. If we are rightly informed as to the quantity of guano still remaining, and, we may add, accumulating in the islands of Peru, the government of that country need be under no apprehension on the subject of revenue, indeed, the opening of the traffic would produce a much larger annual return than at present. So long as the bondholders of Peruvian stock are to be suffered to hoodwink the Peruvian government, so long shall we experience a difficulty in obtaining an adequate supply, and so long will, consequently, prices keep up.

REVIEW OF THE CATTLE TRADE DURING THE PAST MONTH.

The leading feature in the cattle trade of the past month has been the holding of the various annual exhibitions of live stock. From the fact that the different markets had been very indifferently supplied with both beasts and sheep during nearly the whole of the year up to the commencement of December, a great falling off in the supplies for Christmas consumption was pretty generally anticipated. To an extent such has been the case; and the actual result of most of the shows, as well as the large markets, has not been of that high character we have witnessed in many former seasons. It would, therefore, seem necessary that we should trace out the causes which have led to a decreased supply, and the consequences which are likely to result from our present system of feeding. It will be recollected that the quantity of hay produced in this country in 1853 was small, and of very inferior quality, and that the root crops were less weighty than in the preceding year. This season hay and straw have been more abundant, but without adding much to the previously-exhausted stocks. To meet this deficiency, and the scarcity of grass in the pastures—which in many parts of England has been very scanty—large quantities of artificial food have been consumed, notwithstanding its high value. We find, therefore, that stock has been prematurely forced for the various markets, whilst in numerous cases the attempt to increase the weight of the animals has been a complete failure; indeed, we never recollect a season in which so many difficulties have been experienced in producing fat stock than in the one just concluded. In proof of this observation, we may intimate that, although oilcake has been freely used, we have known beasts purchased in the spring to have been sold within the last few weeks at very little over prime cost. Grazing, then, has evidently been less profitable than many parties imagine, though, of course, breeders have realized very large profits: we say large, because the losses by disease have been comparatively trifling. On the other hand, however, we must bear in mind that the latter class have been unsuccessful in increasing their breeding stock, which still continues scarce throughout the country. Consumption, we all know, has of late years progressed rapidly, and to meet high prices and realize good returns, stock has been disposed of at a time when it has been little more than half fat. Thus, immense numbers of young and healthy animals have passed into the hands of the butchers without benefiting the great mass of the consumers. Looking to the future, we have all along regarded the system as fraught with danger, because stock is drawn from the land at too early a period, and an increased price has been obtained, which price, in point of fact, has not benefited any class save the breeders. In a general way we now see little or nothing of those old-fashioned oxen, or those prime old Downs which years since used to form an important feature in the Smithfield supplies. We see little else but animals of a second and third class character, both as to age and weight, and it has now become a notorious fact that the select breeds are now almost wholly possessed by the largest and most eminent graziers, with whom, therefore, there is now scarcely any competition. This is a state of things much to be regretted, and when we consider that the interests of the small graziers and the great mass of the consumers are intimately connected, we further consider that some effort should be made to check the present system, which, unquestionably, works most unfavourably. But then it may be argued that meat would rise enormously in value in the event of supplies being kept back, even for a short period. No doubt a rapid advance would take place; but we are of opinion that it would be better to endure a temporary than a permanent evil. We cannot better illustrate these remarks than by referring to the returns of stock sold in Smithfield within the last ten years. In that period we have received heavy importations from the continent, and yet the aggregate returns have not increased; in other words, consumption has not been fairly met with home produce.

The following supplies have been exhibited in Smithfield in the past month :—

	Head.
Beasts	20,298
Cows	120
Sheep	88,880
Calves	1,573
Pigs	2,746

The above number of beasts was chiefly derived as follows : — Lincolnshire, Leicestershire, and Northamptonshire, 8,000 short-horns; Norfolk and Suffolk, 1,200 Scots and short-horns; other parts of England, 2,200 of various breeds; Ireland, 460 oxen and cows; and Scotland, 1,270 horned and polled Scots.

In glancing at the following comparative table of stock shown in former years, it will be seen that the supply of beasts has fallen off to some extent.

COMPARISON OF SUPPLIES.

	Dec. 1850.	Dec. 1851.	Dec. 1852.	Dec. 1853.
Beasts	24,239	20,554	21,018	23,314
Cows	316	451	540	484
Sheep	99,944	93,462	86,880	88,480
Calves	1,864	1,201	1,898	1,143
Pigs	2,619	2,872	2,259	2,402

In the course of the month the range in the quotations has been as under :—

PER 8LBS. TO SINK THE OFFALS.

	s.	d.		s.	d.
Beef, from	3	4	to	5	4
Mutton	3	6	to	5	4
Veal	4	0	to	5	8
Pork	3	2	to	4	8

COMPARISON OF PRICES.

	Dec. 1850.						Dec. 1851.				
	s.	d.		s.	d.		s.	d.		s.	d.
Beef ..from	2	8	to	4	0	....	2	10	to	4	2
Mutton	2	6		4	2	....	2	10		4	4
Veal	2	6		3	6	....	3	0		4	4
Pork	2	8		4	0	....	2	8		4	0
	Dec. 1852.						Dec. 1853.				
	s.	d.		s.	d		s.	d.		s.	d.
Beef ..from	2	2		4	0	....	3	2		4	10
Mutton	2	10		5	0	....	3	0		5	2
Veal	2	8		4	4	....	3	8		5	0
Pork	2	8		4	0	....	3	4		4	10

Very large quantities of country-killed meat have been on offer in Newgate and Leadenhall. The demand for most kinds, except pork, has ruled steady. Beef has changed hands at from 3s. 2d. to 4s. 8d.; mutton, 3s. 4d. to 4s. 8d.; Veal, 3s. 6d. to 5s.; pork, 3s. to 4s. 8d. per 8lbs. by the carcass. Rough fat has sold at 3s. 6d. per 8lbs.

The imports of foreign stock into London have been on a fair average scale, or as under :—

	Head.
Beasts	4,734
Sheep	12,531
Calves	1,067
Pigs	17
	18,349

In the corresponding month in 1853, the total arrivals amounted to 21,918; in 1852, 17,870; in 1851, 21,594; in 1850, 20,435; and in 1849, 16,368 head.

The general quality and condition of the foreign stock still continue inferior.

NOTTINGHAMSHIRE.

The weather continues mild for the season of the year; and if the adage is worth anything, that "A green Christmas makes a fat church-yard," we cannot expect the season to be a healthy one. The general aspect of the county is good—grass fields green, and all autumnal grain sown promising. The open state of the weather has brought all farming work into a forward state, and we have concluded one of the most favourable seed times we ever remember. The breadth of wheat sown has been far beyond the average. The potato crop is being rapidly consumed; many farmers were under the necessity of putting on their sheep early, and have made heavy inroads on their winter supply of food. As the spring months advance, keep must be scarce. Fat stock is in good demand, and prices rule high; lean stock dull of sale. Our corn markets maintain their position, and seem more likely to advance than otherwise. We remain of the opinion we held at the close of the harvest—when prices went down to 50s. per qr., or thereabouts—that, with the abundant harvest of 1854, we were in no better position than in 1853. The harvest of '53 was wofully deficient, but we had a wonderful supply of corn in hand. The harvest of '54 was about an average, with exceedingly reduced stock. So far, we have seen that our conclusions were correct. Prices of grain must remain high for some time, judging from natural causes. What the proclamation of peace, or a thousand other things, may do to alter the value of grain we cannot tell; but any change arising from these circumstances must produce a value which must be temporary. Where a scarcity exists of any article, it must necessarily rule high. Our labour market continues firm, and good able-bodied men are scarce. At our various hirings of Martinmas servants, wages have ruled as high as £20 per annum for good men-servants, and others in proportion.—Dec. 20.

CALENDAR OF AGRICULTURE.

January is generally the stormiest month of the year over the United Kingdom. Frosts and snows, high winds and heavy rains, very much retard farming operations, but still allowing an onward performance of work. During storms, carry dung from the cattle-feeding yards to the heaps in the fields that are intended for next year's green crops. The heap is sloped at both ends for the carts to pass over and deposit the loads evenly and regularly over the surface. The consolidation prevents the fermenting, till provoked by turning over the heap for use in the spring and early summer. Carry fuel, deliver grain, convey stones for drains and buildings, collect manures of every kind, and earths from the liquid manure pit. Perform all kinds of cartage work.

During fresh and open weather, plough stubbles and lays, and push forward these operations vigorously, as being the best time for ploughing, the lands being soaked by the winter rains, and not dried by the spring winds. Cut hedges and underwood, clean water-courses, cut drains, and collect earths into heaps; pull and store turnips for a supply during storms, and cover the heaps with straw.

During all weathers thrash regularly, to afford fresh straw for provender and litter for the yards, which must be supplied often and thinly. It is essential that all animals lie dry.

During this month the animals of the farm require a very constant attention in regular feeding and management. In the yards bullocks must have a supply of roots daily, from the field in fresh weather, and from the pit during storms—enough to eat, but none to waste, with the cribs cleaned out daily; fresh straw every day, and frequent littering. Milch cows are fed with cabbages, turnips, steamed hay and chaff, with ample littering. Will begin now to drop calves, which are lodged in adjoining pens, one animal in a single apartment, of which the litter is frequently changed. Disturbance is avoided by single confinements.

Sheep in the fields, ewes, hogs, and lambs, require regular feeding with roots cut or sliced, or eaten whole on the ground. Early lambs will now come, and require shelter and convenient feeding with juicy roots.

Swine require the same attention: store swine, raw food, potatoes, and turnips; bacon hogs, meals and steamed potatoes; brood sows, wheys, milks, meals, and bran. A dry warmth is essential to swine—ample litter and warm.

Give light grains to poultry, steamed potatoes, with meals. Separate houses and troughs below a shed roof.

Feed work horses with steamed potatoes or barley, and feed daily with chaff of straw, clover, and meadow hay.

REVIEW OF THE CORN TRADE

DURING THE MONTH OF DECEMBER.

The year now about to close has been one of the most eventful known by a large portion of the present generation: after nearly forty years' peace, Europe has again become involved in war, the end of which no one can foresee. Tens of thousands have already been numbered with the dead, and we appear to be only on the threshold of the great struggle. Many, very many, who gather round the family board have this Christmas to deplore the loss or absence of friend or relative, for not alone has war and all its horrors come among us, but the stroke of pestilence, in the shape of that dreaded disorder, cholera, has carried off its thousands. The year 1854 has indeed been most disastrous; and, whilst we humbly bow to the dispensations of Providence, let us hope that the black cloud may soon pass away, and that the period of time on which we are about to enter may prove more prosperous than the year now about to be numbered with the past. Whilst deploring the many and severe visitations to which the nation has been subjected, we must not forget the inestimable blessing which has been bestowed on the country by the abundance of the harvest. Rarely have we been favoured with more auspicious seasons; and it is no exaggeration to state that a larger amount of food has been raised in the United Kingdom than was perhaps ever before grown. For this the nation cannot be sufficiently grateful: never was a large harvest more needed: the exhaustion of old stocks in all parts of the world, in consequence of the extreme deficiency of the previous year's crops and the difficulties thrown in the way of obtaining supplies from abroad, in consequence of the war with Russia, would have placed this country in a most critical position; indeed, a deficient harvest might, and probably would under the circumstances, have led to want fearful to contemplate. The foregoing remarks may perhaps not be altogether appropriate as a preface to a review of the corn trade, but at a season like the present, which is usually characterized by festivity and rejoicing, it is natural to look back at what we have passed through, and to contemplate the future. May our friends and readers have fortitude and resignation to bear up under the misfortunes which may have fallen to their individual share, and may the New Year bring them peace and happiness.

We must now enter into that portion of our subject to which our remarks are generally confined. Following our usual custom, we shall at the close of the year lay before our readers a short retrospect of the course of the trade during the twelve months. The great event at the opening of 1853 was the imminent danger of Great Britain and France becoming involved in the war then going on between Russia and Turkey. The probability of the supplies of corn from the Black Sea and Azoff being cut off was regarded as sufficient cause to calculate on a high range of prices; and though we were then receiving very large quantities of grain from eastern ports, quotations rose 8s. to 9s. per qr. at Mark Lane in the month of January, and in proportion at most of the principal provincial markets. In February the upward movement received a check: France, who had previously been purchasing largely in the English markets, began suddenly to send us supplies. Considerable re-shipments of American flour were made about this time from Havre. Belgium also furnished some quantity of wheat, and the arrivals from distant ports were meanwhile on a liberal scale: the effect of this was a decline of 5s. per qr. in prices. The depression increased in March, and a further decline of 5s. to 6s. per qr. was the result, bringing prices down to somewhat below the point at which they stood previous to the rise in January. One important cause which operated in favour of the decline, was the generally auspicious nature of the weather throughout the spring. With a larger breadth of land under wheat than usual, the young plant wore a healthy and promising appearance—a circumstance which assisted greatly to allay uneasiness in regard to the future. In the month of April war against Russia was officially declared—the immediate effect of which, aided by decreasing deliveries of wheat from the growers, was a rise of 8s. per qr.; but the extreme advance was not maintained to the close. In May we received very large supplies from ports east of Gibraltar and from the Baltic, and the crops continuing to progress favourably, quotations did not vary materially; on the whole, the tendency was, however, upwards, more particularly towards the close of the month. During June matters remained quiet: the advanced period of the season and the prospect of an excellent harvest were not without their influence, and though the foreign supplies had then begun to fall off, whilst the home deliveries were very small, still wheat receded 1s. to 2s. per qr. Towards the close of July we had a period of very hot weather, by which the crops were forced forward rapidly; under these circumstances, very sanguine hopes of an early and abundant harvest were indulged in, and something like a panic seized sellers: prices fell from day to day, and in the space of a month wheat declined 20s. per qr. at Mark Lane. Early in August samples of the new crop began to be exhibited; and though these were not perhaps all that might be desired in point of quality, there was not much to complain of on that score, whilst the reports in regard to the yield were highly satisfactory: prices then ranged for good new wheat from 60s. to 70s.; some inferior ill-conditioned lots were sold at 50s. to 55s. per qr. Meanwhile old wheat gave way in value to the extent of about 2s. per qr. September proved unusually fine, and the harvest, though commenced later than usual, was brought to a successful termination. The complete exhaustion of old stocks, the fact that the war with Russia would deprive us of further supplies from the Black Sea, &c., were for a time wholly overlooked, and nothing but the abundance of our own crops dwelt upon. The most extraordinary ideas of the probable future range of prices began to be indulged in, and the millers refused to buy except at very low rates. This state of things lasted until the value of capital new Kent and Essex red wheat, weighing 63 lbs. per bushel, had been depressed to 49s. and 50s., and fine white was sold at 55s. to 56s. per qr. Almost immediately afterwards a rally took place, and in the course of a fortnight quotations advanced 8s. per qr. The upward movement became more decided in October; and similar runs of wheat to those sold early in September at 50s. per qr. were before the beginning of November worth 74s. to 76s. per qr., and other sorts rose in proportion. In November business was comparatively calm, and since then the fluctuations have not been extreme.

We have now traced the course of the wheat trade from the beginning to the end of the year. The changes have been greater than in any preceding year for some time back, but we are happy to say that the trade has in general profited by previous experience, and that we have heard of few losses of a serious nature, such as in former periods of excitement have been but too common. To our agricultural friends the year 1854 must, in a pecuniary point of view, have been highly favourable: not only have they secured a large produce of good quality, but all articles have commanded remunerative prices. Our space will not admit of our entering into a minute account of the changes in quotations of other kinds of corn, but, as a general rule, we may remark that the value of wheat has, as usual, influenced that of spring corn, and the rise and fall in prices of the latter has been regulated a good deal by the changes in the former. We shall here dismiss that which has passed, and offer such suggestions as we conceive may assist our readers in forming an opinion in regard to the probable future.

The first and most important matter for consideration is the extent of the stocks on hand; the next, the prospects as regards future supplies from abroad. Positive information on these points is not to be arrived at; still, by careful investigation, a tolerably clear case may be made out. With reference to stocks of old wheat there is little or no difficulty, the greater part of what remains being held in London and a few of the principal ports on the coast: the quantity may, therefore, be pretty nearly ascertained; but it is widely different when the stocks of native-grown wheat are under consideration, as these are spread over the whole kingdom, and there is no statistical information regarding the same.

The importations of foreign wheat have, during the last three or four months, been very much below the usual average; and though the granaries and warehouses were well filled at harvest time, they are now nearly empty. There is, consequently, no difficulty in coming to a conclusion, and we do not hesitate to say that there is less foreign wheat in the United Kingdom than has been the case at any previous period for years past. With respect to what may remain in farmers' hands we can only judge by inference. We shall start then by repeating what we have already asserted, viz., that the last crop was one of unusual abundance, probably a *fourth* above the produce of good average seasons; but, on the other hand, it must be recollected that, owing to the extreme deficiency of the harvest of 1853, there was little or no old wheat of home growth on hand at harvest time. This being the case, the new produce had to be commenced upon almost as soon as it was secured; and so large have been the deliveries ever since, as to render it questionable whether growers at this time hold more wheat than they usually have at the corresponding period of the year. In addition to a very large consumption, a larger quantity than usual has been taken for seed, as the prospect of remunerating prices, and the favourable weather at seed-time, induced farmers to cultivate wheat more extensively than they otherwise might have done. In addition to this, exports to some extent have been made to France and Belgium. We think, therefore, that there is reason to conclude that farmers as a body hold rather less than is generally the case at the commencement of the new year. If this should really prove to be the case, we should require very large imports between the present time and autumn. The next point of consideration is, where are these to come from? As long as the war with Russia continues, no supplies of moment can be looked for from any of the ports east of Gibraltar. There has lately been some talk of the blockade of the mouths of the Danube being raised, but there is no positive information on the subject. Granting, however, that this were the case, we question whether any great quantity could be procured from thence; for it must be recollected that the country through which that river runs, and the provinces where the corn is grown which furnishes the Danube supplies, have been occupied for more than twelve months by hostile armies. Corn has been consumed and destroyed, the cultivation of the land has been interfered with, and the regular course of business interrupted. We think it may, therefore, be fairly concluded that until peace shall have been restored, we cannot safely reckon on any aid from the Black Sea, Azoff, &c. The same may be said in regard to the Mediterranean ports. The Italian States do not appear to have grown sufficient for their own consumption, and the export of grain from Italy has for some time past been prohibited. The French and Belgian governments have also adopted that step to guard against high prices; hence we have only the northern ports of Europe, Spain, and America to depend on for our future supplies. That our prices are sufficiently high to induce great exertions to be made by foreign shippers to send all they can collect to Great Britain cannot be questioned; but the sources from which supplies can reach us have been so narrowed, as to render imports on so extensive a scale as we have of late years been accustomed to receive almost impossible. The question, then, resolves itself into this: Have we adequate stocks on hand to carry us to the next harvest with diminished imports? On this depends the future range of prices. We shall not attempt the answer, but shall leave it to our readers to take each their individual opinion on the subject. A termination of hostilities against Russia would of course work a great change, and the possibility of peace should not be lost sight of. Though we have attempted in the foregoing part of this article to afford an idea of the course of the wheat trade during the year, we shall not omit our usual notice of the transactions at Mark Lane during the month.

The supplies of English wheat into the port of London have been tolerably good. Besides what has been received coastwise, the different lines of railways have brought up fair quantities; and the millers having acted with great caution, the supplies have proved quite equal to the demand. The tendency of prices was, during the first fortnight in December, decidedly downwards. On Monday, the 4th inst., a decline of 1s. to 2s. per qr. took place. This reduction was, however, recovered on that day week; and since then a gradual improvement to the extent of about 2s. per qr. has been established, though the demand has not at any time been active. The London millers are working with very low stocks, and a week or two of short supplies might place them in a somewhat awkward position.

Foreign wheat has come to hand sparingly—altogether only about 10,000 qrs. have been received; it is, however, known that rather a large quantity is now on passage from the Baltic, which has acted as a check, and caused buyers to confine their purchases to what they have been compelled to take to provide for immediate wants. Of that on passage by far the greater portion consists of new, and but little addition is likely to be made to our stocks of old. Meanwhile the damp weather which we have experienced during the greater part of the month has occasioned a greater necessity to employ a certain proportion of old wheat, and holders of the latter have consequently remained exceedingly firm. The difference in the value of old foreign and new English is at present much greater than in ordinary times. This will be shown by comparing Kent red wheat of 63lbs. weight, which would not fetch more than 74s. to 75s., with good Lower Baltic red, which would bring at least 10s. per qr. more, whilst fine Rostock is held at 90s. to 92s. per qr. This great difference in price naturally leads millers to employ as small a portion of old as possible. We have, therefore, had quite a retail trade; but prices are nevertheless 2s. to 3s. per qr. higher than they were at the close of November.

The paucity of offers has prevented much business being done in floating cargoes from the east; the transactions have been confined to a few cargoes of Egyptian wheat at from 50s. to 53s. per qr., cost, freight, and insurance, the prices varying according to quality.

From the Baltic there have been offers of cargoes on passage, as well as for delivery in spring; and the operations have been rather extensive. The rates paid for red wheat have ranged from 70s., cost, freight, and insurance, to 75s. For shipments to be made at first open water somewhat lower rates have been taken, owing to the uncertainty which must attach to political affairs whilst any doubt exists as to how the Prussian government may act.

The top quotation for town-manufactured flour has not varied since our last, it having remained stationary at 73s. per sack; this, however, has not been the case with country-made flour. In the early part of the month the arrivals by the Eastern Counties, and other lines of railway, were very liberal, and sellers pressing. Norfolk household flour was at one time sold as low as 52s. to 53s. per sack; since then there has been a gradual recovery, and the present price is 54s. to 55s. per sack. The arrivals from abroad have been moderate, consisting of a few thousand barrels from America, and a small quantity from Spain; the former has maintained its previous value with extreme firmness, and the latter has been saleable at 63s. to 65s. per sack.

The arrivals of English barley have been liberal, and the export demand, which was rather active in November, having subsequently subsided, prices have receded. The highest point attained last month for fine runs of malting barley was 40s. per qr.; and the total fall since then has been quite 4s. per qr. Within the last eight or ten days the inquiry has again improved, and on the 18th inst. a rally of about 1s. per qr. took place; still it would have been difficult to exceed 36s. per qr. for the best sorts, and fair parcels were sold at 35s. per qr. A few purchases of 53lbs. barley have been made at ports on the east coast at 33s. per qr. free on board: these are said to have been on foreign account. Very little foreign barley has come forward; and the stock in granary consists at present almost exclusively of Egyptian, which has been taken in the absence of any other sort for grinding, at prices nearly the same as those previously current.

The fall in the value of malting barley has naturally influenced prices of malt, and this article must be quoted 1s. to 2s. per qr. lower than at the close of November. The high price of provisions has, it is said, caused a decreased consumption of beer; and the brewers have certainly bought malt less freely than usual.

With rather increased receipts of oats coastwise and per railway, we have had good arrivals of that grain from Ireland, and a moderate supply from abroad. The greater part of the Irish oats came to hand early in the month, and the general belief is that the quantity now on passage from thence is trifling; on the other hand, a fair supply may be looked for from the northern continental ports, so soon as the wind shall have become favourable. On receipt of the Irish supply, the trade became heavy, and factors being in most cases unwilling to land, they preferred to submit to a reduction of 1s. to 2s. per qr. to effect sales from on board. The reduction was greater on black than on white oats, and the former were at one time parted with at 26s. to 27s. per qr. No sooner, however, had the dealers got the bulk of the arrivals in their own hands than they raised the price, and quotations are now about the same as they were when last we addressed our readers, say 27s. 6d. to 28s. 6d. for black Irish; white up to 32s. English feed vary in value from 27s. up to 30s.; Scotch, from 30s. to 33s., and foreign from 28s. up to 32s. per qr. In case the expected foreign supply should be kept out by contrary winds, which does not appear improbable, we might see this grain dearer.

English beans have not sold freely, and the tendency of prices has on the whole been downwards. Egyptian, in granary, have been held at 44s., and a few sales of floating cargoes have been made at 40s. to 42s. per qr., cost, freight, and insurance.

The mildness of the weather has checked the consumption of peas, and the article has met with very little attention. The actual alteration in prices has not been very great, but buyers have certainly had the turn in their favour.

A good business has been done at Liverpool in Indian corn; the purchases have been mostly on Irish account. The supplies of this article have been almost wholly from America, and have been directed almost exclusively to Liverpool.

The principal foreign markets have been influenced by the fluctuations here, but prices of wheat have not varied materially at the leading Baltic ports. The weather having continued open, shipments have been made up to a later period than usual. Still the entire quantity shipped has not been very great, owing, in the first place, to the want of old stocks, further to the smallness of the supplies, and lastly to the extreme scarcity of vessels.

Last week the Christmas holidays interfered with business, and the latest dates are therefore the 23rd inst.: up to that time there had been no frost, and the few ships remaining at the different ports were completing their cargoes.

At Danzig, fine high-mixed wheat had sold at 73s. to 74s., whilst other descriptions had been parted with at from 63s. up to 70s. per qr., free on hand, according to quality.

At Stettin, rather large sales had been made at 63s. to 64s. per qr., free on board for good red wheat. At Rostock, prices were relatively higher.

At the near continental ports, quotations have kept very nearly on a level with ours; the difference being the expenses of transit, hence little margin has been left for profit; still moderate purchases have been made from time to time at Hamburg, Rotterdam, &c.

After the decree prohibiting the export of corn came into force, the French markets became very dull; but the latest advices from that country state that some revival had taken place.

From the Mediterranean we have nothing fresh to communicate; but from Galatz, we learn that some large speculative purchases of wheat had been made at low prices.

The accounts from America are of a similar character to those previously received. They confirm all that has been previously said as to the smallness of stocks at the ports on the seaboard, and the inland navigation having closed, no further supplies of magnitude were expected. There was, therefore, not much to spare for export; and we are told that no shipments of consequence could be expected to be made for great Great Britain before the spring. Meanwhile, prices had been well supported, and were relatively higher than ours.

CURRENCY PER IMPERIAL MEASURE.

Shillings per Quarter

WHEAT, Essex and Kent, white....	76 to	80	extra	82	85
Ditto, red........	71	74	„	75	76
Norfolk, Lincoln. & Yorksh., red..	71	73	„		75
BARLEY, malting, new..	33	34	Chevalier..	35	37
Distilling ..	30	32	Grinding..	—	—
MALT, Essex, Norfolk, and Suffolk, new	70	72	extra		73
Ditto ditto old	68	70	„		72
Kingston, Ware, and town made, new	72	74	„		75
Ditto ditto old	70	72	„		73
RYE...........................	—	—		44	47
OATS, English feed ..	25	28...........	Potato..	28	30
Scotch feed, new 28 29, old 30 31 ..			Potato	31	33
Irish feed, white	26	28	fine		31
Ditto, black	26	28	fine		29
BEANS, Mazagan..................	43	45	„	47	51
Ticks..........................	45	47	„	49	53
Harrow.........................	48	50	„	52	56
Pigeon	48	54	„	56	62
PEAS, white boilers 47 51.. Maple 41	43		Grey	38	40
FLOUR, town made, per sack of 280 lbs.	—	—	„	68	73
Households, Town 63s. 64s. Country		—	„	62	63
Norfolk and Suffolk, ex-ship	—	—	„	53	54

FOREIGN GRAIN.

Shillings per Quarter

WHEAT, Dantzic, mixed..	77 to 80	high mixed	—	85	extra	90
Konigsberg........	75	78	„	— 83	„	85
Rostock, new	79	81	fine	85	„	90
American, white....	77	81	red		75	80
Pomera., Meckbg., and Uckermk., red	77	80	extra ..			85
Silesian.....................	„	—	— white	—		—
Danish and Holstein	„	73	80	„	none	
Odessa, St. Petersburg and Riga..	68	73	fine	—		75
BARLEY, grinding	28	30	Distilling..		31	32
OATS, Dutch, brew, and Polands 28s., 30s. ..			Feed ..		26	28
Danish & Swedish feed 28s. to 29s.			Stralsund		29	30
Russian......	27	30	French..		none	
BEANS, Friesland and Holstein					42	46
Konigsberg..	44	48	Egyptian ..		42	44
PEAS, feeding	42	45	fine boilers		45	50
INDIAN CORN, white.........	44	48	yellow		44	48
FLOUR, French, per sack (none)	—	—	none		—	—
American, sour per barrel	40	42	sweet		45	48

IMPERIAL AVERAGES.

FOR THE LAST SIX WEEKS

	Wheat.		Barley.		Oats.		Rye.		Beans		Peas.	
WEEK ENDING:	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d
Nov. 11, 1854..	72	1	35	0	28	7	42	5	48	10	44	9
Nov. 18, 1854..	72	11	34	7	28	4	41	2	49	2	48	2
Nov. 25, 1854..	74	7	35	6	29	3	44	11	50	5	49	8
Dec. 2, 1854..	74	4	35	10	29	0	45	3	50	2	49	7
Dec. 9, 1854..	73	0	35	2	28	4	46	2	49	5	49	4
Dec. 16, 1854..	72	3	34	6	28	6	47	4	48	9	48	3
Aggregate average of last six weeks	73	0	35	1	28	8	44	6	49	5	49	1
Comparative avge. same time last year	72	3	40	11	25	8	43	6	50	9	54	1
DUTIES........	1	0	1	0	1	0	1	0	1	0	1	0

PRICES OF SEEDS.

BRITISH SEEDS.

Linseed (p. qr.) sowing —s. to 76s.; crushing	62s. to 68s.
Linseed Cakes (per ton)..........	£12 10s. to £13 0s.
Rapeseed (per qr.)	new 66s. to 72s.
Ditto Cake (per ton)...............	£6 15s. to £7 5s.
Cloverseed (per cwt.)...... (nominal)	—s. to —s.
Mustard (per bush.) white 7s. to 8s., brown old	10s. to 13s.
Coriander (per cwt.).. new —s. to —s., old	20s. to 24s.
Canary (per qr.)	48s. to 56s.
Carraway (per cwt.).... new —s. to —s., old	—s. to —s.
Turnip, white (per bush.) —s. to —s. Swede	—s. to —s.
Trefoil (per cwt.) .... new	20s. to 24s.
Cow Grass (per cwt.)	—s. to —s.

HOP MARKET.

BOROUGH, MONDAY, Dec. 23.

The Hop market has not been very active for the past week, although the general currency for all good samples remains firm at fully recent quotations.

PRICES OF BUTTER, CHEESE, HAMS, &c.

Butter, per cwt.	s.	s.	*Cheese, per cwt.*	s.	s.
Friesland	100 to	106	*Cheshire*	66 to	80
Kiel............	104	112	*Cheddar*	68	80
Dorset	110	116	*Double Gloucester*	60	70
Carlow	100	104	*Single do.* ..	55	66
Waterford	94	100	*Hams, York*	90	100
Cork, new	93	100	*Westmoreland*...	90	96
Limerick	90	98	*Irish*	74	86
Sligo	96	102	*Bacon, Wilts., dried*..	65	68
Fresh, per doz.	14s. 0d.	16s. 0d.	„ *green*....	60	63

CHICORY.

LONDON, SATURDAY, DEC. 23.

This week's import has been only 32 bags from Hambro'. Although the demand is in a sluggish state, and we have large parcels on offer, prices are supported.

Per ton.

	£	s.	£	s.		£	s.	£	s.
Foreign root (in bond) Harlingen	11	0	11	10	*Roasted & ground*				
English root (free)					*English*.........	14	0	20	0
Guernsey......	9	0	9	10	*Foreign*..........	30	0	36	0
York..........	9	0	9	10	*Guernsey*	26	0	28	0

ENGLISH WOOL MARKET.

DECEMBER 23.

Not the slightest improvement has taken place in the demand for any kind of English Wool. Prices are almost nominal; and to effect large sales, lower prices must be submitted to. The supply on offer is good.

	s.	d.		s.	d.
Down tegs	1	0	—	1	1
Half-breds	1	0	—	1	0½
Ewes, clothing	0	11	—	1	0
Kent Fleeces	1	1	—	1	1
Combing Skins	1	0	—	1	1½
Flannel Wool...........	0	11	—	1	1
Blanket Wool...........	0	9	—	1	1
Leicester Fleeces	0	11½	—	1	0½

LEEDS (ENGLISH) WOOL MARKET, Dec. 22.—There has been no change of moment since last week; rather more business is still doing, and prices are firm.

LIVERPOOL WOOL MARKET, DECEMBER 23.

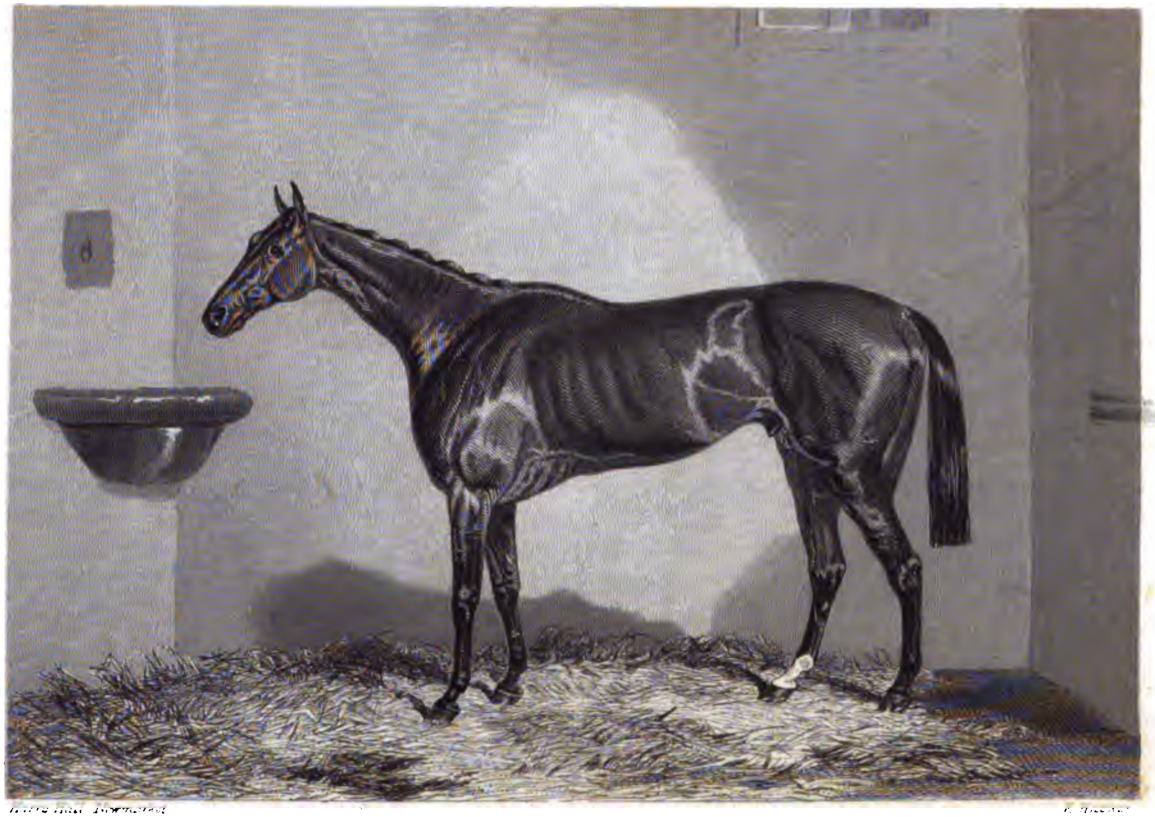
SCOTCH WOOL.—There continues a fair demand for Laid Highland Wool at late rates; still only for immediate wants. White Highland is still enquired for, and stocks not heavy. The demand has been more active for good Crossed and Cheviots, at fully late rates, while inferior sorts are quite neglected

	s.	d.		s.	d.
Laid Highland Wool, per 24lbs.....	9	0	to	10	0
White Highland do................	12	0		13	6
Laid Crossed do..unwashed	11	0		13	0
Do. do..washed	12	0		13	6
Laid Cheviot do..unwashed....	13	0		15	0
Do. do..washed	14	6		17	0
White Cheviot do ...do	21	6		24	0

Printed by Rogerson and Tuxford, 246, Strand, London.

A [illegible] Ram.

[illegible]



Harry Hall, Newmarket

E. Hacker

Andover.

[illegible]

PLATE III.

A LONG-WOOLLED RAM,

The property of William Lane, Esq., of Broadfields Farm, Northleach, for which the First Prize of Thirty Sovereigns was awarded at the Meeting of the Royal Agricultural Society of England, held at Lincoln, July, 1854.

PLATE IV.

ANDOVER; WINNER OF THE DERBY, 1854.

Andover, bred by Mr. W. Etwall, in 1851, was got by Bay Middleton, dam (sister to Ægis) by Defence.

Andover is a good hard bay horse, standing barely fifteen hands two inches high; he has a very blood-like handsome head, strong neck, beautiful shoulders, and great depth of girth; if anything, he is somewhat slack in his loins, but has strong quarters, short gaskins, with very good knees and hocks—large in the bone and short in the leg. He is altogether a low, lengthy, and very good-looking horse, with a capital even temper to carry out his other accomplishments. His only "mark" is the white off-side heel.

THE FOREIGN MATTERS FOUND IN DRAINAGE WATERS.

BY CUTHBERT W. JOHNSON, ESQ., F.R.S.

If I again recur thus early in the pages of this valuable magazine to the use of drainage water, it is from a deep sense of its importance; and, moreover, since we were last month considering the question, I have met with one or two facts which well support the position I then endeavoured to maintain—that the drainage waters of very many lands contain matters which ought not to be allowed to escape from the farm. Do not, in fact, Nature's suggestions tell us that it is so? If the agriculturist notices the efforts which plants make to extend their roots around and into drains, he will reflect that those sometimes to him annoying extensions are not meaningless. It does not need the explanations of the chemist to assure the intelligent farmer that the roots are thus extended because some essential food of the plant is to be found in those drains, nutriment of which the surrounding soil does not furnish so ready a supply. If we suppose that it is only the mere *moisture* of the drainage water that the roots are attracted by, even that conclusion does not much weaken the importance of employing those drainage waters in irrigation. But when the drainer notices that the roots do not confine themselvs to drains containing only the more pure varieties of land water, but that, on the contrary, the richer, the more impure land waters have their drain pipes the most rapidly encircled, and if possible filled with roots. After such observations, I repeat, the landowner must conclude that it is something besides the mere moisture by which the roots are so strongly attracted.

Let us, then, refresh our memories by recurring to a few of the curious examinations which have been reported as to the nature of these foreign, these frequently drain-obstructing matters in land waters.

The importance of the inquiry some little time since attracted the attention of Lord Carlisle; for, in a circular addressed to various persons of well-known intelligence, he asked several questions full of interest on the subject we are now considering. Amongst other matters on which he solicited information, he asked—"Have any important applications been made of the additional water streams thus derived, or are any possible applications apparent?" There were several answers received to this inquiry ("Appendix to Report of Metro. Sewers Com. in Surburban and Land Drainage"). "In a few places I have observed, and in some cases I have admired," observed Mr. James Smith, of Deanston, "the useful application of the water from drains for irrigation, &c. The most extensive and perfect application of water derived from thorough drainage which I have had an opportunity of examining, is upon the estate of Lord Hatherton, in Staffordshire. His lordship has there had collected, very cleverly, the drainage water of the higher lands of his estate; he has erected several ponds for storing it, and he has it carried to his farm-yard, where it drives a powerful water-wheel, which does all the thrashing, milling, chopping, &c., and drives a saw-mill besides. From the mill the water is carried in canals of gentle fall to cover meadow grounds, where it is used in extensive and profitable irrigation. Drain water always contains more or less of the farm manure, and soluble parts of the soil, in suspension, and the fertilizing properties of the drain water on this estate are particularly marked by the very luxuriant growth of grass it produces on the meadows. This experiment forms a noble example of an economy in agriculture worthy of imitation, and is one which can be carried out to a greater or less extent on all farms having surfaces at different altitudes. I have been long of opinion that it would be found profitable to have a large pond at the lowest point of every farm, to receive and store the water from the drains, and to have a steam-engine to pump and convey it in pipes for watering the fields during the dry periods. By this means the crops would be much refreshed, and whatever matter had been taken off the land by the drain water would in great part be returned. This system would be more profitable if the steam-engine and pipes were likewise used to distribute liquid manure over the fields, as is now done on a farm of 300 acres in extent near Glasgow."

The farmers will note, too, that by such a plan the whole rain fall is employed more than once in the soils, and for the crops which need it most. And supposing the common objection is urged that the thus collected waters are too limited in amount for any useful purpose, then let the landowner consider that, provided none of these waters are allowed to escape from the farm, these will annually increase in amount, since the more water is returned to the soil, the greater will be the amount issuing from its drains.

Mr. Alexander Maccaw, of Ardlocan, in the course of his reply to the same question of Lord Carlisle, notices the existence of organic matters in the drainage of land which had been fertilized with liquid manure: he said—"I have very recently noticed in the suburbs of Glasgow, where liquid manure is extensively used and distributed by a powerful engine through pipes, that the water from the drains is highly impregnated with the liquid in colour, taste and smell, and all the open water-courses over a considerable district give strong indications of a great escape of the manure, from the drains carrying it rapidly away. From a recent analysis of the water from a deep-seated spring, arising out of rock, from the lower part of a town in my neighbourhood, it was found to contain a quantity of animal matter in a state of solution, showing that such cannot, by filtration through a great depth of soil, be extracted from water."

In reply to Lord Carlisle's question, "Are there any cases known where observations have been made as to the *quality* of the water derived from the land drainage?" Mr. James Smith said: "The water flowing from drains is generally very limpid and pure, although at times, when much manure has been recently put upon the land, it is impregnated to a considerable degree with soluble and sometimes colouring matter. It is, nevertheless, usually fit for domestic purposes, and is much prized where there are but few springs, and where the people, previous to the introduction of thorough draining, had to bring the water for domestic purposes from a distance by carts at a great expense. They now form wells to retain a supply of the drainage water for the dry seasons, by which their health and comfort have been greatly promoted. The cattle are also supplied with wholesome water in the summer. The temperature of the water flowing from drains depends in a great measure upon its origin, as to what proportion comes from under-springs, and what from rain-water passing through the soil. The deep drains, of course, catch more of the spring water than the shallow ones. The water yielded by drains that derive their supply chiefly from the rain which falls upon the surface of the land, is frequently during the summer months raised considerably in its temperature, owing to the heated condition of the atmosphere, and of the ground on which it has fallen. The organic matters escaping from the soil by every drain, soaking away, dissolved in every drop of water, can hardly be too carefully regarded, and their examination will probably hereafter afford an extensive field of chemical research. The stoppage of the tile drains of the farmer are instances of these carryings away of organic matter. A digest of the matters forming the stoppages of tile drains is given in *Johnson and Shaw's Farmers' Almanack* for the year 1850, p. 7; amongst other substances a sort of slimy weed, remarks Mr. Denison (in case the volume of water is so great as at any time to fill the tile), will, in some soils, form in the drain, at the imminent risk of filling up the tiles. Such a case occurred to Mr. M'Lagan, of Pampherston, Mid-Calder, in 1848. The stoppage matter was examined by Professor Johnston, who observes very truly that this case illustrates what we must all have frequently had occasion to remark, how the conjoined knowledge of the observing farmer, of the chemist, and of the botanist are often necessary to clear up matters which heedless men neglect, but which appear, as they really are, of important economical interest to the prudent practical man. In this case the drain was 3½ feet deep, the tiles had a bore of 5 by 4 inches, with an average fall, and a considerable run of water in it whenever the weather was the least wet. The substance with which the drains were stopped was of a dirty grey colour, was slimy and tenacious, appearing to consist, when pulled asunder, of minute fibres, too fine to be easily detected by the eye. This, upon being examined by Dr. R. K. Greville, was found by him to be an alga (*conferva bombycina*), "the filaments being exceedingly fine, and the whole acts as a cobweb in catching and retaining minute insects and larvæ, and floating particles of inorganic matter, which was the cause of the specimen appearing like a soft jelly-like mud." The origin of this growth in the drain was afterwards traced to the liquid manure draining into them from a dung-heap at the head of the field. Thence the very sensible conclusion to which Mr. M'Lagan is led. "It is not enough to say that a dunghill has been placed thousands of times on the top of a drain, and no harm was ever seen to result from it; but who can tell that thousands of drains have not been injured from such a cause, though no one ever knew or suspected it?"

These vegetable matters I have noticed to abound sometimes in the inside of the pipes which are employed for sewage purposes. I observe, for instance, that in two pipes of about a foot in diameter each, which are carried at Croydon near to the surface under some meadows, these are thickly coated in the inside with these plants; but in the same pipes placed under and about houses, at greater depths from the surface, the same phenomenon is not apparent. It is certain, then, that drain-obstructing matters are carried off from a soil in the drainage waters, especially if oxide of iron and earthy matters also abound. Mr. J. Parkes tells us (*Jour. Royal Ag. Soc.*, vol. vii., p. 261), "I have found at Drayton Manor, and many other places where ferruginous matter abounds, that stoppage from its deposit is much more frequent towards the higher than nearer the outfall end of a line of drain; and for the very obvious reason that the flow of water there is greatly less both in quantity and velocity, and consequently of less force than it is as it approaches the end of its course." A specimen of a deposit in a drain pipe from Drayton being analyzed by Mr. R. Phillips, was found to contain—

Silica and alumina	49.2
Peroxide of iron	27.8
Organic matter	23.0

Some of the obstructions to which land drains are subject have been well alluded to in the present number of the *Transactions of the Highland Society* (vol. for 1855, p. 422), at the conclusion of a valuable prize essay on drainage, by Mr. George M'Pherson, of Huntley, in Aberdeenshire. This paper may be, I think, usefully read when the farmer is weighing by his fireside the merits of the systems so well advocated by my friends Denton and Webster, at the last discussion at the Central Farmers' Club. For, although my business on this occasion is only with a small portion of Mr. M'Pherson's paper, yet in the prize essay the farmer will find the results of a considerable experience in drainage over an estate of about 60,000 acres, in the north of Aberdeenshire—a tract of land in which it is evident that, from the nature of the climate, great skill and enterprise are necessary to keep it in a state of profitable cultivation. Some of the obstructions which often impede the drainer's operations are touched upon by Mr. M'Pherson. One cause, he says, occurs in mossy land, in which the drainage has been generally attended with partial success, even where no difficulties have come in the way of a sufficient fall or outfall, or in cutting the drains thoroughly through the moss into the softish blue clay on which it usually rests. The fibrous sponge-like texture of this soil seems to hold the water; and until it has been compressed by being wrought and cropped for some time, it does not part with it, although there may be plenty of channels for its escape. The drains on this sort of ground are very liable to be choked up. It contains a quantity of iron ore, so fatal to drains in many situations. The water which runs from moss carries in it the materials of fresh peat, which are deposited in the tiles. Upon opening several drains destroyed in mossy soil in this way, the soft pulp which had filled the tiles was, when dried, found to be a little peat.

Another cause of obstruction, adds Mr. M'Pherson, occurs when water of fine spring quality is brought into drains. This water produces a thread-like growth, which rapidly fills the tile. No trace of this growth entering the tiles from the outside at their junctions has been found. It commences at these junctions, fastens on the edges of the tiles, spreads over the inside like network, and runs along the drain, filling the tile, and catching every particle of sediment which the water may carry into it. We see, then, that land water, as might have been reasonably concluded, does remove from cultivated soils a portion of their soluble matters, and that these substances are a loss to the cultivator. In considering, therefore, the advantage of collecting and storing such waters for the purpose of watering the land, the addition to the irrigated soil of so much water is not the only advantage, since that water is never met with in a state of purity. The organic and other substances detected in them by the chemist add, in a certain degree, to their value; and when the irrigator has, moreover, the not very rare advantage of using waters rendered impure by the drainage of towns, or other causes, he then is no longer confined to the use of mere waterings of the soil, for he thus distributes organic manure over his fields in the best and the most economical manner; he supplies his crops, it is true, with moisture; but let us remember that he enriches his soil by the same operation.

CONSUMPTION AND PRODUCTION.

SIR,—The two elements of commerce named at the head of my letter are the balances by which it is regulated, the *primum mobile* of all its transactions. They are the original instigators of commerce in its simplest as well as most complicated, its rudest as well as most systematic, form. They constitute the first indications of civilization—the first requisite in those combinations of mankind of which human societies are composed. In the nomadic state, the wants of individuals are self-supplied, and every one depends on his own unaided efforts to procure the immediate necessaries of life; but as soon as a society is begun to be formed, however rude or simple in its construction, the question of consumption and production becomes an essential condition of its existence, and means must be devised to enable the one to meet the requirements of the other, and for regulating the relative proportions between demand and supply. Such is the nature and origin of commerce in all its stages, from the barter trade of the South Sea Islander, to the monster operations of the merchant-kings in Leadenhall-street, or the millionaire of the Royal Exchange.

The first consideration in the commerce of all nations must necessarily have reference to the supply of food; for unless this is attended to, the most frightful evils ensue. It is to the want of foresight and attention thereto that the frequent famines of former times are to be attributed. Of late years, with the exception of those in Ireland, an absolute famine of bread has not been experienced in any European country; the nearest approach to it in England having occurred at the commencement of the present century, when the price of wheat rose, at one period, as high as to £10 per quarter. But even then, it amounted only to a scarcity, not to famine; and since the peace of 1815, and the renewal of friendly intercourse with Continental Europe, the supply of bread-corn has been regular and systematic—certainly to a sufficient extent to avert either famine or scarcity, although failing to prevent a fluctuation in prices.

Circumstances, however, have occurred of late years which materially interfere with the amount of production, and so to alter the relative proportions between demand and supply, as to render scarcity, if not occasional famine, a possible contingency of the future. These circumstances will continue to operate; and it is now evident that, throughout Western Europe at least, consumption has more than overtaken production; and that it will require considerable management, on the part of commercial men, so to adjust the balances as to bring these two elements of commerce into harmonious proportion with each other, more especially if war continues. The causes of this discrepance I shall now endeavour to point out.

In England there are two causes existing which have operated, the one to increase the consumption, and the other to decrease the production, of bread corn. The first is, the increase of the population, which, as we have only a certain quantity of land available for agriculture, must necessarily increase the disproportion every year. The turning point at which consumption overtook production in England I have, on a former occasion, stated to have taken place in 1824, since which period the disproportion has gradually increased, until a very large importation is, under any circumstances of the crop, become an absolute necessity.

The second cause arises from the first, and has effected a decrease of produce, which, although not so palpable as the increase of consumption, is, nevertheless, an indisputable fact, so far, at least, as the breadth of land employed in the growing of bread corn is concerned. For, with the increase of population, there has also been a corresponding increase in the consumption of *animal* as well as vegetable food, requiring a larger supply of cattle both for the butcher and the dairy, and, consequently, a larger breadth of grazing land and arable land, for the production of green crops to rear and feed them. It is scarcely necessary for me to remind the reader that meat of every kind has maintained its price even at the time when wheat was at the lowest; and the general opinion is, that a large quantity of land was then laid down with grass, for the purpose of meeting the increased demand for beef, mutton, &c., which kept pace with the demand for bread corn, but could not so readily be imported from abroad. It is true that this decrease in the quantity of land devoted to bread corn has been, in some measure, met by improvements in agriculture, and the use of guano, and other condensed manures, by which the produce of the land has been materially increased; so that, with a smaller breadth under wheat, we have an almost equal quantity of produce. But this cannot go on to an indefinite extent; and, as we have reason to suppose that the population will continue to increase on the principle of compound interest we shall want considerably larger supplies of both animal and vegetable productions from abroad, to meet the increasing demand.

We must next turn to the Continent of Europe; and, first, with regard to France, where the same causes are operating as in England—namely, increasing population, with a decreasing breadth of land devoted to cereal produce. But in France, this latter cause is further aggravated by the large absorption of land in the cultivation of the Silesian beetroot, to supply the manufacturers of sugar. So seriously, indeed, has this cause operated, that it is believed the French Government contemplates opening the ports of that country to foreign East and West India sugar, which, it is supposed, would at once put a period to the beet sugar manufacturers. This, however, I have strong doubts of, and that it would be necessary for the Government to use more stringent measures for the purpose. Certainly, the price of East and West India sugar would advance, so that the beet sugar would have to compete with them in price rather than quality; and it would at once be brought to the test, whether that article can be produced at a profit without any protection. At any rate, France must increase her production of bread corn under any circumstances, or suffer, as of late, the recurrence of scarcity; and Louis Napoleon knows too well the evils arising from a high price of bread, by causing disaffection to a government, not to use every means to avert them.

The same causes are operating in Prussia, Austria, Belgium, Holland, Bavaria, and most of the minor German States. With the exception of Belgium and Holland, agriculture is at a low ebb in most of the Continental States, and by no means keeps pace with the increasing requirements. But Belgium and Holland are grazing, more than agricultural, countries, and purchase large quantities of grain themselves from the Baltic, &c., partly for home consumption, and partly for re-exportation. And with regard to the Baltic ports, it is sufficiently evident that the extraordinary exportation of last season exhausted the stocks of wheat to such a degree as materially to affect the price the present season, so that it is a question whether we shall obtain near the usual quantity of wheat from thence, when the ports open again in the spring. Certain it is, that we have had much less from thence since harvest than usual, although the war has made no difference in the navigation from the friendly ports of that sea.

Now, entertaining, as I do, an increasing conviction in my own mind that the price of corn in future cannot, on the average, rule low, I am anxious to impress on the farmers the importance of keeping up a system of high farming, as the most profitable—I would say, as certain to prove remunerative *whether we have war or peace*. Whilst our wants must annually become greater, the only quarters to which we can look with certainty for a supply of bread corn in future are the Black Sea, the Nile, and the American Continent. From the first we shall certainly obtain none whilst the war continues; and the supplies from Egypt will, from the same cause, be subject to competition. And, with regard to America, it is now ascertained beyond a doubt, that, under the stimulus of high prices here, she strained the export of wheat and flour to such a degree last year as to exhaust her stock, and leave herself so bare that, having a deficient crop, the consequence is, the price of wheat and flour is as high at this time in New York as it is in Mark Lane, with a prospect of still higher rates in future.

Whether, therefore, we continue at war, or obtain a speedy peace, I feel convinced that farming will, hereafter, be as profitable a business in which to invest a capital as any in this country, and that the land will pay for whatever in reason is expended upon it. We have not yet reached the maximum of production, either in corn, pasture, or green crops; and as the demand for both is *certain* to increase annually, it must be the object of the farmer not to lay down his tilled land in grass because meat bears a temporary higher relative price than corn, but to "make two blades of grass grow" on his present pastures where only one is now produced, by improved farming; and, applying the same principle to his tilled land, make it produce a larger result, instead of breaking up his pasture land because wheat is dear in war time.

Let the farmer also study the comparative qualities and value of manures, *judging by their chemical composition*, and, so far as his capital admits, raise the quality of his land by superior drainage, tillage, and manuring; and let him rest assured that he has no need to fear either a want of demand or a too abundant supply. Yours truly,

S. C.

London, 13*th January*, 1855.

THE LOSS ON FAT STOCK.

There are few nicer distinctions to be made in the pursuits of agriculture than in the breeding as against the mere feeding of stock. Of the former of these it is not too much to say that never did the subject enjoy so general an attention as it does at present, and that never was it more susceptible of being rendered a profitable occupation. From all sides we have this confirmed. Public sales of Shorthorns and Devons, that go far to realize all that puff preliminary which the auctioneer may have indulged in; continual reports from our seaport towns of pure-bred beasts being shipped off at prices once only to be associated with the thorough-bred horse. One man is known to be making a fortune by his flock of sheep; another grounding his repute on a breed of pigs; and a third even claiming all the honours and profits of successful enterprise with a brood of chickens. If growing good crops of corn be just now at a premium, breeding good sorts of stock is certainly not less directly encouraged. We have plenty of customers still, both at home and abroad, ready and anxious to give the best prices for the best wares.

Mr. Mechi, who, true to his professed object, rarely delivers an address but he creates a discussion upon some point advanced in it, has been equally fortunate in this respect on his last appearance in public. The debate, to be sure, which followed the reading of his paper at the Society of Arts, had in reality but little to do with the several topics thus associated by its author. Nearly every speaker that followed would the rather seem to have come prepared with some favourite theme of his own, for the due advertisement of which the Tiptree Heath experiences served sufficiently well as the stalking-horse. Few, however, would look for any very critical analysis of a farmer's balance sheet in a meeting of the members of a Metropolitan Society of Arts. At any rate, it has never been so as yet, and most probably never will. It is on the circulation of these addresses by means of the agricultural press of the country, when the statements made, and opinions recorded, meet the eyes of the farmers themselves, that the discussion may be considered to actually commence.

It has been so in this instance. Mr. Mechi, in his recent address, has ventured to further enlarge on a point which he had before more occasionally touched on. "Stock," he had assured us, "was but the sunny side of agriculture, directly there was little if any profit in feeding cattle, and they must be only regarded as the passing means for something better." We quote from memory, but, as we believe, with sufficient correctness. At the meeting the other day, however, there is not the slightest fear of our misunderstanding him. The condemnation he had already hinted, is now put with more decided emphasis and confidence. "I have no doubt this statement will startle many a practical farmer, and will raise a storm of indignation amongst stock-feeders and stock-breeders; but the naked truth is best told, which is 'that live stock are necessary evils, mere manufacturers of manure, and unattended with any direct profit;' that if you give them cake and hay while feeding off your turnips and green crops, the return for these green and root crops will be 'nil,' and their cost must be charged to the corn crops against the manure. I am firm in this opinion, not only from my own extensive stock-feeding, but from an extended observation, as well as by the undeniable proofs recorded by Mr. Lawes in the *Royal Agricultural Society's Journal*."

This is the verdict itself. In summing up, it had been preceded with a reference to the speaker's own more immediate experience:—"It seems very ungracious that when you have grown a splendid crop of turnips, at an expense of £7 to £10 the acre, the sheep are to consume it, leaving you nothing but the price of the hay and cake you gave them with it;

but it is a system that cannot be avoided until you find some cheaper sources of manure. The man who does not feed off his green crops, but attempts to steal extra crops of corn, soon impoverishes the land and himself too. All our most successful farmers are large purchasers of cake and artificial manure. Amongst the evidences of enlightenment and improvement of the present day, is the introduction of covered homestalls of farm-yards, where the animals and manure are both sheltered from adverse weather. This is one of the paying moves in agriculture. But to return to live stock; a reference to my balance-sheet will confirm what I have stated. After paying for purchase food, shelter, and attendance, the sheep and bullocks left a mere nothing for the cost of producing some 70 acres of fine roots and green crops. Owing to my system of managing live stock, I never have disease; but when I find Insurance Companies charging 20 per cent. for insuring animals, it is an evidence of ruinous mismanagement, and would form a charge on my farm of £200 per annum."

As Mr. Mechi himself had expected, here is the debateable part of his address. It is on this question that he has now again to "prove what he says." It should be still recollected, as has been frequently remarked, that after all, with all his craving for discovery and advancement, Mr. Mechi rarely makes a demonstration that has not been made before. It is so, too, even here. Notwithstanding the opposition with which in some quarters his decree is received, few of our readers will require to be told that this loss upon the feeding of cattle is an old story. Mr. Mechi himself supports his own opinion with that of "a Lincolnshire farmer who consumed £500 of cake annually, and being asked how he charged it? 'Oh,' said he, 'half to the bullocks, and half to the manure.'" With regard to sheep, Mr. Mechi continues: "As a general rule, when we buy them for fattening, we pay one penny per pound more for them than we could realise for the same weight when fat. This is the penalty we have to pay to the breeder, who has to provide the bone and offal in the animal." Of the pig he has a rather more favourable opinion; "There is nothing loses so little, because he makes a quick return, and you get paid meat price for his skin, which is not the case with other animals; his offal is also valuable. I find, with a very extensive practice, that with fine heavy barley at 30s. per qr., and pork at 6d. per lb. net, pigs will 'clear their teeth,' or pay for their food, leaving attendance, housing, and casualties as a charge against the manure." It was only this last week we were assured by a Berkshire farmer, when taking his opinion on this very subject, that he would at any time gladly give a lot of pigs to any one who would fatten them on his premises. The offer, too, is well worth mentioning, the gentleman who thus expressed himself having appeared at some of the meetings of the Royal Agricultural Society as an exhibitor of prize pigs.

We may take even further evidence to show that Mr. Mechi does not stand alone here: and it may be interesting to collate his deductions, with those of a gentleman out of his own immediate neighbourhood. It would be difficult to find a better farmer, or a more thoroughly practical one, than Mr. William Hutley, of Powers Hall, Witham. As in our own case, he and Mr. Mechi do not always agree; but for once, at least, let us endeavour to bring them together. What, then, Mr. Mechi says in the Christmas of 1854, Mr. Hutley said in the spring of 1848. In Shaw and Corbet's Digest of the Tenant Right Committee Inquiry the following extract from Mr. Hutley's evidence will be found under the chapter headed Temporary Improvements:—

Do you keep any beasts? Yes, I mostly fatten from 90 to 100 beasts.

How do you fatten those beasts? Upon mangel wurzel, Swede turnips, and oil-cake.

Do you look for a return for the oil-cake in the increased value of your beasts, or do you look for it in the manure? Partly in the corn and partly in the bullock.

You do not then expect to be remunerated for the outlay of the oil-cake in the improvement of the beasts only? No, I never had a lot of bullocks that paid me in my life for the oil-cake and vegetables.

What proportion do you reckon the loss in the oil-cake as far as the return of meat goes? One-third with the oil-cake is the loss against the bullock.

What is your opinion of giving oil-cake to sheep? I give a great deal of cake to sheep: I should say that sheep pay better for the cake than the bullocks.

Although you do not obtain a return for the oil-cake expended upon the beasts, do you consider the keeping of beasts essential to high farming? You cannot do without them.

It is the only way you see of converting the straw into good dung? Yes, it is the only way of converting the straw into good dung.

The experience of Mr. Samuel Jonas, as taken from the same work, is also so much to the point that we must find room for it:

Do you consider that the beasts which you so fat pay you in the increase of their meat? Far from that; so much so that I once made an offer that I would give any one £1,000 a-year to fat 500 bullocks on my farm.

You calculate, on the food you give to your beasts you lose about £2 a-head in the proceeds of the sale of the animal, and are only brought home by the increased value of the manure that is made by those beasts? Exactly so.

Is that the case also with the cake which you give to your sheep? Not exactly so.

You have stated that with respect to sheep there is not so much loss as upon bullocks? No.

Have you any loss at all in feeding sheep in the manner you have described? No, I do not think I am a loser.

Do you think you gain? Yes, I should say so in some years; this year I shall, with the high price of mutton.

On the average of years, do you gain or lose in the amount of capital expended in that way? On an average of years, I am a gainer by feeding sheep.

You consider that on the 2,000 sheep which you fat, that the increased value of the animal when fat does not bring you home as to the cost of the artificial food you use? There we may get some little return, but not on the cattle. In fatting sheep it is not that loss to tenant farmers; but in fatting beasts you are obliged to fat a certain quantity of beasts for the consumption of the straw to make it into manure.

You look for your remuneration in the increased quantity of corn that you hope to obtain in the succeeding year or years? Exactly so.

That remuneration would of course depend upon the price of corn? No question of it.

If the price of corn fell below a certain amount there would be no remuneration? Certainly not.

This, it will be seen, is evidence all one way, that goes far to corroborate what Mr. Mechi asserts. As a weak point in modern agriculture, we believe he has done service by again mooting the question; while in calling attention to it here, we only do so with the desire of seeing it yet more fully discussed. If stock can be fed with a fair profit, we can only say our columns are open to the more general development of the system.

AGRICULTURAL POSSIBILITIES.

No. I.

I am in deed and in truth a practical farmer, and one of the old school too; but having experienced much, and seen more of practical farming in the modern acceptation and application of the term, I cannot but rejoice at the highly satisfactory and rapid progress made in such practice: I cannot shut my eyes to the many and vast improvements already achieved, nor to the wide range still before us; so that my hopes and expectations are large and comprehensive—almost unbounded. I know of no limit to agricultural progress; nor do I believe its advance can now be seriously checked by any vicissitude to which it may be subjected. The agricultural world is fully aroused; the minds of farmers are fully alive to every onward movement; prejudice, that bar to all improvement, is arrested; conviction, the result of observation and thought, is now predominant; all parties acknowledge an improved agriculture, and very many are looking forward to more extensive advancement. It is with the view of aiding this advance that I have chosen, at the commencement of another year of my contributions to the *Mark Lane Express*, the subject named above —"Agricultural Possibilities." I purpose confining myself to a very few papers upon it, although it gives me abundant scope; and my desire is to show how far the great modern innovations sought to be introduced into farm practice can be beneficially carried out; and also, on the contrary, their futility and uselessness, and to urge their consequent abandonment.

In passing, I wish for one moment to notice an isolated case of existing prejudice against steam culture. One of the speakers at the late meeting of the Society of Arts professed to dismiss the subject in a word: a very summary and very common way indeed—worthy of the days of yore. I well remember the first thrashing machine worked by horse-power being introduced into the parish. I also recollect the introduction of ridge-culture, two-horse ploughs, and other early improvements of various kinds—all exciting the most foolish opposition and ridicule. What a change has now taken place, not only in my parish, but everywhere! Why, the other day one of my oldest neighbours, a man of 72 years, said, "If I had to commence business again, the first thing I would buy should be a steam-engine." We are all looking forward to the extended application of steam to agricultural purposes: our labourers are preparing to plough and cultivate, to reap and mow, by aid of steam; and why should they not? What insurmountable obstacle stands in the way? It is a pleasing feature to find our men ready to adopt such improvements as they arise, and even longing for their introduction—the idea being that it is much easier, and far more noble, to direct a machine to fulfil their task, or do their work, rather than to go through all themselves; and assuredly such will eventually be the case in agriculture as in manufactures—well-regulated machinery will supply the place of much hard manual labour, the labourer himself becoming the engineer and attendant.

1st. **STEAM CULTURE.**—This is the greatest and most important innovation upon old-established farm practice, and the one I propose first to inquire into and carefully examine, with a view of showing how far steam appliances can be made beneficial in promoting agricultural advancement with safety and economy.

Steam has become the great motive-power of the age, and to deny this power to the agriculturist is to leave him out of course in the grand march of improvement on which the world is bent. Its application is all but universal in every other department of the world's progress. It propels the mighty castles of war, the merchant's craft, and the passenger's saloons across the ocean's depths; it drives the reel of the spinner and the loom of the weaver; it works the press of the printer, the stones of the miller; it drives the pile of the engineer, and pumps clear the coffer-dam; it raises from the lowest depths the wealth of the miner, and beats the iron of the smelter into its required form; it is made most serviceable in innumerable minor details of general business; and its gigantic iron horse is for ever traversing the length and breadth of many lands with inconceivable speed, bearing along and distributing the vast resources of a nation's wealth and industry, with a regularity and facility altogether unknown and unthought-of since the world began. Yes, this wonderful appliance of power is fast turning every other department in the world's business, pleasures, and duties, into unheard-of channels of profit and usefulness; and the greater the power obtained, the greater and more numerous appear to be the openings or outlets for the industry and energies of the people. Shall agriculture then, that sound foundation of a nation's wealth, be left behind in this great movement? Certainly not. The sons of the soil are not the men of the past century: no class of men have attained a higher standing, or are pressing forward in the highway of knowledge with greater earnestness and zeal, than the agriculturists of the present day; and albeit they may continue to act cautiously and prudently, yet but once show or demonstrate to them a really improved implement or course of management, and it is speedily and very generally adopted—as witness the introduction of artificial food for stock, of artificial manurings for soils, and of various particular implements for cultivation, thrashing, or other farm operations.

It is true that this great motive power has been for a considerable time employed in works of drainage, and with surprising advantage; large tracks of country have been recovered from a bed of waters, to become the most fertile and productive of all lands; and within the past few years it has been much employed in some of the common operations of the farm—in thrashing, irrigating, and a few minor matters, such as chaff-cutting, cake-breaking, &c. This is all well, but far, far below what may be anticipated from its general introduction into every practicable department of farm practice, and to which event very many farmers are anxiously looking forward.

The agricultural mind is open to some grand and important step of this kind; and it is my intention in my next papers to endeavour to show how or in what manner such introduction may be carried out, so as to prove beneficial to every class of farmers.

P. F.

THE PUBLISHED RESULTS OF AGRICULTURAL EXPERIENCE.

Lest any of our readers should doubt the practicability of codifying the published results of agricultural experience, or ignore the advantages of comparing the progressive steps made in each department—of grouping the various subjects into classes, and endeavouring to define rules for them, we must refer to some cases in which this has been actually done. The works of different authors, detailing their personal studies and experiments; the treatises of agricultural chemists and men of science; the compilations and original contributions comprised in encyclopædias and journals, are not what we mean. But take, as a first example, "The Code of Agriculture," by Sir John Sinclair, published in 1817. It is, so to speak, the distilled essence of the materials amassed together by the Board of Agriculture, which appeared in 47 octavo volumes on the state of the English counties, in 30 volumes more on those of Scotland, and in 7 quartos on specific subjects. From the very commencement, Sir John had contemplated the composition of a *code* out of the information which might be collected; and his fitness for the performance consisted not alone in his having access to these books, but in his having discussed the various topics of husbandry with practical men—his having surveyed their farms, compared the various systems of foreign countries, and, above all, his having been himself a farmer, and that on a great scale. The book he produced was, consequently, a complete manual for the farmer in every point; embracing all that was known at that time of the scientific, economical, and commercial branches of agriculture, together with projected means of improvement. It might be worth while, indeed, to test the value of a work like his, by comparing his suggestions with the measures which have been subsequently made successful in reclaiming and improving land. Next we may point out the two volumes of "British Husbandry," published by the Useful Knowledge Society, in 1834, as examples of the same kind. Then, further, we have the valuable periodical summaries of agricultural progress which Mr. Pusey has contributed in our Royal Agricultural Society's Journal.

Quitting now this topic, we proceed to the consideration of more special practical matters, adopting the comprehensive mode of treatment to which we have alluded.

We will begin, not with drainage, which has been called the first principal operation, or manuring, which has been said to be the second, but with tillage, which must surely be the prime labour of cultivation. Ever since the curse was pronounced, that the ground should yield "thorns and thistles," so that only "in the sweat of his brow" should man eat bread, the toils of husbandry have been two-fold—one department being to search for and carefully preserve the unsown spontaneous fruitage of the earth for man and cattle; the other to increase and improve that produce by industrial art. But the time has now arrived when we are hardly satisfied to follow any custom, however ancient, without enquiring into the reasons which support it. Philosophers, poets, all the learned authors who ever speculated upon the origin of the practice, have given (says Tull) only this explanation: "Tillage increases the product of the earth, *because it does.*" In the present day, however, we are beginning to apply in agricultural studies the principle (so universally acknowledged in other arts), that in order to improve rapidly, we must cease to trust in mere accidental discoveries, and fix clearly in what particular directions our efforts should be concentrated. English agriculture cannot afford to waste any of its inventive genius in barren fields of research: let us try to find, therefore, what are the most probable means for improving our operations of *tillage*. And instead of the common *a priori* method, involving the theory of the soil and vegetable growth, we will just review the steps which have been made in actual practice.

"When Adam delved," whether he merely scratched the ground, or dug and turned it over with a sharpened stick, we cannot tell; but according to Mr. Hoskyns, in his "History of Agriculture," the earliest known form of tool was *not*, as we might suppose, a simple *spade*, but a really framed and manufactured implement,—an idea as contrary to our preconceived notions as if in the animal kingdom the jointed *articulata* should have preceded the less complicated *mollusca*. The Egyptian "sarcle" was a sort of mattock, pick, or hoe with a large blade; this forming an acute angle with the shaft or handle, and being connected with it both at the apex, and by a band or bar holding the two arms at a certain distance apart,—reminding one, in fact, of the capital letter A with one leg shorter than the other. With this the workman cleaved the ground, using it as we do the pickaxe, dragging towards him the broken soil; as he stands on which, the treading of his feet helps, *in a dry climate*, to break the clods. In parts of Spain, Portugal, Madeira, the Brazils, the West Indies, China, it is still the common implement of culture; and is used in Devonshire for paring and grubbing up furzy land. Now let it be observed that the *plough was not introduced to perform another style of work*, but was simply a modification of the original implement, so that beasts might effect by their natural mode of *draught* what had hitherto been done by manual chopping or "adzing." The handle of the sarcle was elongated so that oxen could be yoked to it; and a stilt was added at the apex, by which the driver could hold the blade steady.

Egyptian, Greek, and Roman ploughs were all conversions of this kind; and in China, India, and indeed in all "the East," the same model is universal. In Peru the plough may perhaps betray its likeness rather to the spade than to the mattock, as it has a cross-bar near the share, on which the ploughman sets his foot to drive it into the ground, as a workman does in digging. Ploughs without coulter or mould-board certainly could not cut and turn a furrow-slice as ours now do, but they managed to accomplish somewhat more than a mere marking or scarifying of the surface. The plough being held always leaning sideways away from the unploughed land, the share did not cut the bottom of the furrow horizontally, but obliquely, and cast out on one side and partially turned over the loosened mould, leaving a clear trench to receive the next furrow. The furrows were all thrown one way as in turn-wrest ploughing, by inclining the share alternately towards either hand. This method is still in use in Italy and the South of France. Turning up a deep furrow of strong wet land is a thing never attempted by implements of such small power: where there is even a turf to be broken, they go over it several times before it is all torn to pieces. On the dry soils of a warm climate, however, they perform with great ease and expedition, and with such good effect that *we have imitated their action by our grubbers and cultivators* as the best means of obtaining a complete pulverisation. But instead of employing these upon whole ground, we are obliged to break and lighten up our stubborn clays and stiff moist loams before we can pursue the same kind of preparatory tillage (only in greater perfection) which obtains over the rest of the world.

THE RURAL ECONOMY OF ENGLAND, SCOTLAND, AND IRELAND, BY LEONCE DE LAVERGNE.

Some year and a-half since, a French gentleman, then on a visit to this country, made the Royal Agricultural Society's meeting at Gloucester the subject of two or three amusing letters to a Parisian journal. They were translated into English almost immediately on their appearance, as many of our readers will no doubt remember, we having at the time called attention to, and quoted from them. They contained, indeed, much to recommend them—were honest and original in their tone, faithfully detailing a foreigner's first impressions, and inclining to allow every credit for the spirit and perseverance which had consummated such a festival. Smart, graphic, and sketchy in style, they were just the kind of reports one might imagine a French correspondent would indite—too superficial to aim at anything like importance, and well content with describing the scene as it was set out, without essaying to inquire how or why it had been fostered.

Monsieur de Lavergne, however, has now proved himself to be something more than merely "our own correspondent." The favour with which his passing notices of such gatherings as that at Gloucester were received, induced him to go more profoundly into the subject, and to show us how well he has profited by his repeated visits to this country. He has, in fact, made himself so thoroughly acquainted with the rural life of this kingdom as to have become almost naturalised. You recognize no longer the ingenuous wonder of the stranger; much inclined to admire, though still half-inclined to quiz, what he does not altogether understand. There is little, on the other hand, but he has studied; while the deeper his researches the more readily does he appreciate the value of what has been done, and the more earnestly does he call upon his own countrymen to follow our example.

"The Rural Economy of England, Scotland, and Ireland, by Leonce de Lavergne," is a work that ought to do much for the agriculture of France. It appears at a very appropriate period, and is just the kind of instructor that might emanate directly from the Government. With the many sources for the continual distribution of information which we now possess, it is not to be supposed that the English farmer will gather anything very novel from M. Lavergne's volume. The ground he goes over has already been well travelled; while in addition to his own personal experience of what he writes on, our author candidly avows that he has availed himself fully of the periodical literature here devoted to the consideration of rural economy.

The result of this judicious combination of material is a work, which, if only interesting to the English, should be, we repeat, of incalculable service to the French agriculturist. It is not always that we are ourselves ready to do anything like justice to what we may have accomplished. We have plenty of authorities still amongst us ready to assure one another that English agriculture is a disgrace to the people—that the English farmer is a sloth and a dunce, and the English labourer something worse, from almost every point of his condition, than any of his class elsewhere. Monsieur Lavergne, after a very careful tour of the whole of the United Kingdom, is inclined to let us off rather more easily. He makes us, indeed, as agriculturists, an example for every other people in the world—for his own most especially. "The fact is," he writes in his second page, "that English agriculture, taken as a whole, is at this day the first in the world; and it is in the way of realizing further progress." He acknowledges his own countrymen may not be quite prepared to admit this—"In France, perhaps, more than anywhere, and that too notwithstanding our proximity, the belief that agriculture in England had been neglected for the sake of the manufacturing and mercantile interests has, hitherto, been too prevalent." Whatever may have been intended or expected, we are not amongst those who would have to thank any Government of late, for its especial care or consideration towards agriculture. The truth is, agriculture has not been neglected, because agriculture has taken care of itself. This does not always appear to strike our stranger visitor as forcibly as one might have supposed: it is nevertheless the case. Of all pursuits in this country, there is none which has had its wants so little attended to, or, as a consequence, has had to do so much for itself, as the art of agriculture.

M. Lavergne proposes to himself, at starting, the fulfilment of two great duties—the first to show the actual condition of British farming; and as the second, to point out the true causes of that condition. We must say that very admirably has he accomplished all that he undertook. It is not always, to be sure, that we can quite agree with him; at the same time, it is really extraordinary to find how correct he is in the detail of that busines he is bent upon teaching. In the different breeds of our cattle, in the several modes of cultivation in practice, his summary of what is going on is alike to be relied on. He becomes, too, at times, bold enough to condemn, and often enough anxious to suggest something towards our yet further ascendancy.

As we propose again returning to the work, we may content ourselves here with one pregnant sentence, already going the round of the papers, as to "the real superiority of this constitution of agriculture." "It lies," then, "in Great Britain at least—for Ireland requires a separate examination—in these two important points: first, the almost universal system of leases, which makes agriculture a special occupation; and secondly, the number of monied men who fearlessly embark in farming." One reads this over again, before becoming quite willing to "pass" it as thus intended. That the employment of capital is the *first* great secret of success in agriculture is a truism patent enough. That this, however, is associated *generally* in Great Britain with a universal system of leases, is more startling, especially when we come to remember that the case is precisely the reverse. Leases may be "the almost universal system" in Scotland—and the work comes out under the care of "a Scottish farmer"—but they are as certainly not so in Great Britain generally. We say nothing on their real merits, many as they possess; but we are bound to come to the fact. The advance of British agriculture, so far, is attributed to an almost general system of leases, by a stranger, whom it will be our duty to show has been grossly misinformed. We begin, indeed, to doubt whether M. Lavergne or his translator have not made some mistake as to the real meaning of the word; when fortunately, in only the succeeding page, we are put right again. "In England they (long leases) are almost unknown, or, rather, it happens pretty frequently that they have no lease at all. *Three-fourths of the farms are held upon what is called tenancy-at-will.*" This is more like it. And yet our contemporaries are quoting "the constitution" of English agriculture as something which it is not, and instancing one of the most palpable of the few grand errors in an otherwise very careful production. It is capital, and security for capital, no doubt, that have made "the constitution" of English agriculture; but the lease, so far, has had very little to do with it. The evidence to this fact is too general to require any very especial mention. It was only, however, at the very last gathering of the Smithfield Club that we heard the President, his Grace the Duke Richmond, speak to the reluctance still evinced by the tenant farmers to take leases. Liberty of action, one of M. Lavergne's grand specifics, is certainly more directly attainable in a good business-like tenant-right custom, or agreement.

TITHE COMMUTATION AVERAGES.

SIR,—As your readers may feel anxious to know the result of the corn averages for the seven years to Christmas last, published in the *London Gazette* of the 5th inst., viz. :—

	s.	d.	
Wheat	6	0¾	per imp. bush.
Barley	3	7¾	do.
Oats	2	6	do.

I beg to state for their information that each £100 of tithe rent-charge will, for the year 1855, amount to £89 15s. 8¾d., which is a reduction of £1 3s. 8¼d. from last year's value.

The following statement from my "Annual Tithe Commutation Tables" will show the worth of £100 of tithe rent-charge for each year since the passing of the Tithe Commutation Act, viz. :—

		£	s.	d.
For the year	1837	98	13	9¾
,,	1838	97	7	11
,,	1839	95	7	9
,,	1840	98	15	9½
,,	1841	102	12	5¼
,,	1842	105	8	2¾
,,	1843	105	12	2¼
,,	1844	104	3	5¼
,,	1845	103	17	11¼
,,	1846	102	17	8¾
,,	1847	99	18	10¼
,,	1848	102	1	0
,,	1849	100	3	7¾
,,	1850	98	16	10
,,	1851	96	11	4¾
,,	1852	93	16	11¼
,,	1853	91	13	5¾
,,	1854	90	19	5
,,	1855	89	15	8¾
	19)	1,878	14	6¼
General average for 19 years		£98	17	7¼

I am, Sir, your most obedient servant,

CHARLES M. WILLICH,

Actuary University Life Office.

25, *Suffolk-street*, *Pall-mall*, *Jan*. 8, 1855.

PORTABLE STEAM-ENGINE FOR AGRICULTURAL PURPOSES.—The *Chester Courant* describes an engine which has been recently manufactured at the works of Messrs. Williams and Mowle, of that city. It is of eight horse-power, very neatly constructed, and fitted on a carriage to be drawn by a horse. It has been made expressly (says the *Courant*) for our gallant neighbour, General Viscount Combermere, who takes a warm interest in the improvement of agriculture, and who intends it to be used in the cutting of timber, and other farming purposes.

THE PRACTICE OF AGRICULTURE.

No one will question the necessity of placing the practice of agriculture upon a footing with other branches of manufactures, and by so combining the practical with the scientific departments as to reduce it to a principle, and, so far as the leading branches of it are concerned, not to allow questions upon the subjects of cultivation, drainage, and manuring to be treated as if we were entering upon a new science, with an unexplored field before us.

The simple process of tilling the soil has been long known and practised successfully, and so far as the means afforded—by the use of the plough and harrow—probably was as well done a century ago as at the present moment; but the improvement in implements has rendered the practical processes of the work more easily and less expensively performed—a desideratum in all agricultural matters, and therefore worthy of our first consideration.

The continuous exposure of the soil to atmospheric influence is known to be highly beneficial; and the affinity existing between the elements of the soil, and the gaseous matters existing in common atmospheric air, denotes the necessity of repeated exposure and pulverization; and thence, in the early periods of agriculture, the extensive practice of clean fallows, when by continuous ploughing and harrowing through ten months of the entire year, sufficient benefit was obtained to enable the land to produce a crop in the following year. As the knowledge of esculent root crops was then unknown for winter consumption by animals, perhaps no better mode could then be devised for effecting the object; and to such an extent was it prevalent, that although the system has long become exploded by the best farmers, still most of the leases of the eastern and southern counties retain clauses, making it still imperative, wholly or in part.

The practice of growing upon our arable land a large proportion of green crops for summer feeding, and of root and brassica crops for winter feeding, demands the application of implements that will with facility effect the double process of clearing the soil from weeds, and effect the degree of pulverization necessary to their production; and hence the host of scarifiers, broadshares, eradicators, and pulverizers, &c., that now form the principal department of our agricultural exhibitors.

The old adage that "scarifiers are bad ploughs but good harrows" exemplifies the utility of these implements; nor can we even now controvert it, for at this moment we are not acquainted with any implement that will so readily bring the soil into immediate cultivation as the plough; and combined with the scarifier, roller, and harrow, the whole process of pulverization may be readily effected, and in a manner more perfect than could be accomplished by any one or two of these implements alone.

It will be necessary therefore to consider in detail the operation as it proceeds, and to show a few material points that require attention, some of which have escaped the notice of less practised agriculturists.

To begin, therefore, we will state in the outset that nature never ceases to produce, upon every description of soil, weeds, or natural grasses, whenever the surface is not occupied by crops artificially produced, or otherwise rendered incapable of producing them by continuously stirring the surface. It therefore becomes obvious that immediately upon the removal of one description of crop the preparation for another should be immediately commenced; and if the rotation and system of cropping be perfect, the necessary employment of the horses and workmen will follow in quick and regular succession and order.

As soon, therefore, as the harvest operations have become sufficiently advanced to admit the plough, the processes of cleaning and preparing the land should be immediately put into operation. And as the space to operate upon becomes day by day more extended, then it behoves the operator to advance his object by those means by which the greatest amount of surface may be stirred in the least time, for the double object of eradicating couch and root-weeds, as of pulverizing the surface and stimulating the annual seeds into action. For this purpose various implements have been invented of great excellence, such as broadshares, scarifiers, and cultivators, that with the small number of horses and men effect four times and even six times as much in the same time as the ordinary plough; these, with the harrowing that follows, entirely pulverize the surface, and effect the object before adverted to.

If, however, the land is required for an immediate crop of turnips, rape, vetches, rye, &c., the plough becomes absolutely necessary to secure the object; this may be immediately followed by the scarifier, harrow, and roller, as may become necessary, repeating the operation until the whole of the root-weeds are brought to the surface.

By the assistance of the implements before-named it will be seen that the advancement in the department of autumn-fallowing will have arrived at such a state of perfection as to supersede the old method of summer fallowing, and it is possible thus to plough and thoroughly pulverize every portion of the arable land of a farm not already in green crops, clover, and grasses, previously to commencing the wheat sowing, and in addition to plough the land before scarified also, so that every portion of the farm may in suitable seasons be rendered capable of receiving a crop, or be in a very forward state for the root crops of the succeeding year.

Upon well-managed farms, where the soil is friable and easily pulverized, no portion of it should ever be unoccupied. May-day should find the farm fully cropped; and as the foddering of the rye, vetches, &c., proceeds, the same processes that took place in the autumn should be again renewed. Immediately upon removing any portion of these crops, the surface should be thoroughly cleaned, and the rubbish collected and carted to the farmyard or compost heap, and the land ploughed, harrowed thoroughly, scarified and again harrowed, before the small fibrous roots of the previous crops become dried, so as to ensure the fullest degree of pulverisation being effected. Especial attention is requisite in this portion of the labour; for it will be found, if the land is ploughed only, and suffered to remain until the furrows become dried by the sun and air, that twice the amount of labour afterwards bestowed will not effect the object so well, by reason of every fibre of the roots (especially of vetches) becoming so toughened that the best implements will not then effect the object; so that instead of fine mould for the production of turnip crops, a combination of minute clods will become the result, which neither retain moisture nor resist the admission of air sufficiently to accelerate their growth.

It was not our intention to state so fully the mere processes of agriculture; but as our aim is to exhibit the great benefit derived by the assistance of newly-invented implements in the cultivation of arable land, it struck us that it could not be better done than by showing how they might be most advantageously employed.

What were the original processes may be readily and easily defined. One-fourth or even one moiety of the arable land of our arable farms did not produce any crop. The land remained in the same state throughout the autumn and early winter months as it had been left by the cereal crops of the preceding year; and previously to the plough entering upon it, it had become a sward of natural grasses and weeds; it therefore frequently required a whole summer's fallow to eradicate that which had been suffered to accumulate in the preceding autumn. But the mischief did not end there; for the accumulation of vegetable matter thus produced had become a nucleus for wire-worms and insects to prey upon the crops of the succeeding years. The absence of root crops upon the farm prevented a sufficient number of animals being kept to convert the offal straw into manure; and the reduction in the number of horses, also kept, to cultivate the farm, only increased the deterioration.

It is mainly upon this account that the cultivators of small farms cannot now subsist by their business. Without sufficient force of horses or adequate implements they are unable to adopt the new system; and the absence of oxen, cows, and sheep precludes the manufacture of manure; and reduced to the necessity of making all their payments from the scanty crops of grain produced, they rarely, notwithstanding their frugal and industrious habits, long succeed. Painful as this conclusion is, we deeply deplore their unfortunate position, believing that they fill a place in civilised society, not only necessary but beneficial.

On the other hand, however, the growing necessity of producing the largest amount of human food from the soil of this kingdom demands the fullest development of the means best calculated to ensure it; and therefore we enter upon the task as a duty, and which we shall resume in our succeeding numbers.

CAVALRY HORSES.—The difficulty experienced in procuring horses to mount our cavalry has involved serious consideration in various quarters. In the September number of this publication I referred to it, at the same time proposing an augmentation of price. That plan has been adopted upon a sliding scale. Thirty-two pounds is now authorised to be given for five years old horses, and forty pounds for six, seven, and eight years old. Whether this will be found quite a judicious arrangement the sequel will prove. It would be more in conformity with practical experience of the value of working horses, if the maximum price had been accorded to five, six, and seven-year-olds, and a reduction made in the price for eight-year-olds; but such is the imperative demand for effective animals, that prices will not, it is expected, be very scrupulously adhered to, providing the qualifications are equivalent. The demand is enhanced by commissioners from the French Government, who are willing to advance upon our regulation prices. I have recently given the subject much attention, and, with the most profound respect, will offer a suggestion to encourage farmers to breed horses for the especial purpose of mounting the troops. The proposal is, that premiums be given by Government for the best horses exhibited at the meetings of the Royal Agricultural Society of England, and at other influential agricultural meetings, on the following terms:—Fifty pounds for the best horse calculated for the use of the regiments of Life Guards; thirty pounds for the best horse calculated for the Artillery and Dragoon regiments; and twenty pounds for the best horse calculated for the use of the light cavalry regiments; with the proviso that any horse entered for competition should be subject to the claim of Government at the regulation price of the class for which he is adapted; and the illegibility of the horse for the class in which his owner proposes to enter to be determined by the Government inspector, giving the owner the option of withdrawing from competition in the event of his not approving the class which may be assigned to his horse. This would be a means of bringing a great number of horses together, and save great expense of officers of regiments and agents attending fairs in search of them—an expense nearly equivalent to the amount proposed to be given in premiums.—*The Sporting Review.*

THE LIVE AND DEAD-MEAT COMMERCE OF OUR CHRISTMAS FAT-STOCK SHOWS.

The many opinions which have been expressed on this subject, some approving and others condemning present practices, naturally lead the enquiring mind to entertain the question of progress, so as to reduce to harmony the opposite arguments involved. Some, for example, argue that it is absolutely necessary to carry feeding to the utmost limit the health of the animal admits of, in order to test its constitutional and fattening characteristics; and there cannot be a doubt but the proposition is susceptible of easy proof. Others, again, admitting the soundness of this proposition, conclude that our present practices have gone a long way beyond its limits, condemning all the fat stock of our Christmas exhibitions as over-fat, and their dead meat as unfit for human food; and there cannot be a doubt but this conclusion is also true to a certain extent. How, therefore, can we reconcile such conflicting circumstances as are here involved? What improvements in practice are necessary in order to confine fattening within its proper limits, thus avoiding unhealthy animals and diseased butcher-meat?

The improvement in question cannot be successfully effected without the joint co-operation of the farmer and butcher, whose interests in this as in all other questions connected with fat stock are inseparable. In other words, we must have a Christmas exhibition of dead meat as well as live stock, before the facts of the case can be brought home to the conviction of the public, or even farmers and butchers themselves; for, on the one hand, however good the health of the ox may be in the feeding-box, it may be injured, and the meat diseased, before it reaches the shambles; and, on the other, if he is unhealthy at home, how can the butcher have good meat for his customers, after his ox undergoes the trying influences of a Christmas cattle-show? Whereas, were we to adopt the ordinary practice of the trade, of slaughtering so many at home, and forwarding invoices to dead-meat salesmen, so as to have the carcases exhibited, either by placing them in the hands of butchers or otherwise, as the case may be, and of forwarding so many alive, either directly to the Smithfield Club exhibition, as in the case of the metropolis, or to live-stock salesmen, for being slaughtered and exhibited by butchers, then every individual would have an opportunity of comparing the butcher-meat of extra-fat stock with that of the ordinary market, so as to be able to judge for himself in a satisfactory manner, which is more than he can now do.

A Christmas exhibition of dead meat, in the manner proposed, would not only bring it before the public in a manner which would allow of its quality being satisfactorily determined, but it would also afford farmers and butchers more reliable means for the improvement of their respective professions than they now have. The farmer, for instance, would then have an opportunity of examining both sides of the article he manufactured, the actual quantity of it from a given amount of raw material, and the influence which different kinds of food have upon quality, chemistry determining results of this kind with as much satisfaction as she now does the different qualities of guano; while butchers would not only profit by the information they would thus receive in common with the farmer, but also by the improved stock sent to market, and the means which they would acquire for enabling them to improve their own trade relative to the feeding, management, and slaughtering of fat stock, so as to maintain the quality of the meat at its highest standard of value.

In order to illustrate our subject, let us take a fat ox for an example. Now, every part of this ox has its value, but different parts possess different values. When the loin, rump, and forerib are worth *eight-pence* per pound (quoting the substance of this from Johnson and Blackie's "Cyclopædia of Agriculture"), then the buttock, thick flank, and middlerib will fetch *six-pence;* the itchbone, adzebone, or edgebone, mouse round, thin flank, chuck rib, brisket, and leg-of-mutton piece, *five-pence;* the clod, sticking-piece, and neck, *three-pence;* and the shin and leg, only *two-pence;* thus forming five qualities out of the carcass of the ox, each of which is different in value from the other, and which, for the sake of perspicuity, may be tabulated thus:—

1st quality at 8d. per lb.	1. Loin.
	2. Rump.
	3. Forerib.
2nd quality at 6d. per lb.	4. Buttock.
	5. Thick flank.
	6. Middlerib.
3rd quality at 5d. per lb.	7. Itchbone.
	8. Mouse round.
	9. Thin flank.
	10. Chuckrib.
	11. Brisket.
	12. Leg-of-mutton piece.
4th quality at 3d. per lb. ..	13. Clod, sticking piece, and neck.
5th quality at 2d. per lb.	14. Shin.
	15. Leg.

And, besides the above five qualities of different money values, the fifteen parts into which the carcase of the ox is usually divided have each a different value to the cook, deserving of special notice; for it is here where the merits of each are brought to the test, and therefore their respective culinary qualities would require to be separately investigated at every dead-meat exhibition.

Again, the different parts constituting the offal have each a separate value. Thus, the value of the hide is different from that of the loose fat; loose fat from the heart, liver, and lights; these latter from the tripe; tripe from gut; gut from blood; and blood from the contents of the stomach and intestines; besides the head, tongue, and tail, amounting to no fewer than ten separate qualities and as many values.

The whole ox, it will thus be seen, is subdivided into about 25 parts, each of which has a different value, intrinsically as well as pecuniary; and were some five or six oxen of each of our different breeds thus subdivided and exhibited, the respective parts in competition with each other, the show would be no less interesting and instructive to the public generally than the farmer and butcher, furnishing to each a volume of information more valuable than all the books which possibly could be written on the subject. No doubt there would be exceptions, to whom the proposition of such an exhibition may appear unworthy of serious consideration: five Devons of each of the classes exhibited in Baker-street, for instance; five Herefords, five short-horns, &c., with so many sheep and pigs of each class, thus arranged and distributed over a huge show-room, would, no doubt, appear a very different spectacle from the living animals themselves; but false impressions of this kind would soon disappear the moment the real merits of the scene were comprehended. In evidence of this, we may just mention that during the last few years we ourselves have been in the habit of examining very carefully the fat stock exhibited in Baker-street, and as many of their carcases when slaughtered as we possibly could: and that the oftener we examine the two, the more deeply are we convinced that the latter (the dead-meat show) is the practical plan for arriving at useful conclusions. Judging of the quality of beef, mutton, and pork in Baker-street always reminds us of "buying a pig in a sack;" whereas on the butcher's stall the lean, fat, and bone, as also the weights of the different parts, are differently seen and handled.

Many of our most intelligent practical men in connection with agriculture and the butcher-trade believe that the dead-meat trade will ultimately supersede the live stock; and this conviction is based not on merely speculative ratiocination, but experience. Both the farmer and butcher, for instance, are beginning to find that, in the British capital, Newgate Market suits them better than Smithfield; and a glance at the different parts of the ox we have just enumerated, and the demands of the family butcher, who can only sell a few of them, returning in many cases three-fourths of the fore-quarters he kills to the dead-meat market, will readily furnish the most superficial observer with a practical reason. With the exception of the hide and loose fat, the rest of the offal, with legs and shins, are worth more to the farmer for manure than what such butchers are able to give for them. In point of fact, they would give more for the ox without them than with them, were it possible thus to effect an agreement.

It is, no doubt, the arbitrary character of this family demand, and the necessity which butchers experience in complying with it, together with the small insignificant price received for so much of the offal, that has given rise to intermediate jobbing, and the slaughter of so many of the beasts sold in Smithfield for the dead-meat market, in order that a more economical distribution of parts may be effected. The provincial butcher, again, feels that he can realize more for the finer parts in the metropolis than he can at home, and less for the fore-quarters, while railway communication is facilitating compliance with both these demands; hence not only the increase of dead meat to the capital, but the greater increase of the finer parts; while the fore-quarters are sent to our manufacturing districts.

The necessity again of a greater economy of manurial products on the part of the country, and sanitary reform on the part of every large town, is daily becoming more manifest, increasing the value of offal to the farmer, but reducing its value to the butcher. This is perhaps the most interesting portion of our subject, and therefore we shall resume the consideration of details in a separate article.

Now, a dead-meat exhibition, with prizes and medals for the best parts—age, quality, and weight being duly considered—would stimulate improvement in the carcase trade, very much enhancing the interest of both farmer and butcher, analogous to what has taken place at our shows of live stock and implements. No one can deny that our breeds of cattle, and quality of implements and machinery, have been greatly improved by the honourable competition which has taken place at our annual meetings; and it would be unreasonable to suppose that the same spirit of emulation would not be experienced equally efficacious in connexion with the dead-meat trade. Nor would its good effects be confined to the carcase trade only; for butchers generally would benefit by it—they falling into the march of progress with a similar degree of anxiety to advance the science and practice of their trade as farmers have done throughout the provinces.

FLOWER-POTS FOR ROOMS.—Fill a pot with coarse moss of any kind, in the same manner as it would be filled with earth, and place a cutting or a seed in this moss: it will succeed admirably, especially with plants destined to ornament a drawing-room. In such a situation, plants grown in moss will thrive better than in garden mould, and possess the very great advantage of not causing dirt by the earth washing out of them when watered. For transportation, plants rooted in moss are said to be better adapted, on account of their lightness. The explanation of the practice seems to be this: that moss rammed into a pot, and subjected to continual watering, is soon brought into a state of decomposition, when it becomes a very pure vegetable mould; and it is well known that very pure vegetable mould is the most proper of all materials for the growth of almost all kinds of plants. The moss would also not retain more moisture than precisely the quantity best adapted to the absorbent powers of the root, a condition which can scarcely be obtained with any certainty by the use of earth.

THE AGRICULTURAL GEOLOGY OF ENGLAND AND WALES.

BY JOHN DONALDSON.

(*Continued from page* 521, *vol.* xli.)

KIMMERIDGE CLAY

Occupies the valleys of the Upper Oolites, and accompanies these rocks in Buckinghamshire, Oxfordshire, Berkshire, in Dorsetshire, in Wiltshire by Devizes, and in Yorkshire on the north side of the vale of Pickering. The substratum of the whole of the Isle of Portland is formed by Kimmeridge clay, where it is capped by an abrupt escarpment of the superior oolitic beds. The depth varies from 100 to 200 feet. It gets the name from the locality, where the slate clay appears in the abrupt cliff of a greyish yellow colour, containing both animal and vegetable impressions. The rock passes into a slate clay and bituminous shale, which effervesces slightly, and burns heavily. Alum has been manufactured from it. The animal remains are marine, and the bones cetaceous.

The agricultural character is a tenacious clay land, often covered with oak woods, and has hence been called "oak-tree clay." The quality is cold and repulsive, arising from the bituminous nature of the original rock, which has been decomposed into an earthy mass. The tenacity is wetter in nature than the clunch clay of Oxfordshire and the fens, but less viscous than the London clay, and stronger in the body than the Wealden formation. The draining is done in the way previously recommended for pure clay soils; and farm-yard dung is the only manure that can act on the harsh composition of the soil. A rotation of cropping as follows would suit the land now mentioned:

1st year, fallow; 2nd year, wheat; 3rd year, hay; 4th year, pasture; 5th year, pasture; 6th year, oats. Two years in grass will make the course of five years, which may probably seem more expedient.

The water on these clays is deficient and bad in quality.

GAULT

(*Gebirgsart*, German—a hilly or mountain earth, denoting the nature or quality of the rocks), or Golt, &c., is an argillaceous deposit that lies between and divides the upper and lower sands, or the iron and green varieties of that formation. The colour is pale blue, varying to green, and becoming on exposure a brown buffy hue, inclining to black. It runs through the whole county of Sussex, from Eastbourne westwards into Hampshire; it is seen near to Godstone in Surrey, and called "black-land;" it appears at Farnham, Alton, and hence to Beachy-head; in Hertfordshire and Cambridgeshire it occupies a large breadth, and the towns of Shefford and Biggleswade stand upon it. The upper part, which is next the green sand, is harsh and sandy, with green particles; the lower part is uniform, plastic, and of a light blue colour.

The gault of Sussex is said to be a rich soil, that of Cambridge of the middling quality, and that of Godstone is decidedly poor. The deposit of Cambridge is considered a variety of the chalk marl, which crops out from beneath the boundary of the chalk. It occupies a considerable extent of surface, reaching to the boundary of Huntingdonshire and Bedfordshire; the thickness is variable, averaging perhaps from 200 to 220 feet. It is nearly impervious to water, and differs from the true gault clay. The formation in Sussex may have been more denuded than the Godstone variety, and thus deprived of the green ferruginous quality which adheres to the upper sand. The texture is not very viscous, but it requires the summer fallowing process of cultivation, and the use of farm-yard dung. It requires very frequent draining, as before described. Near Lewes, in Sussex, the stratum is 250 feet thick.

The clay at Tetsworth in Oxfordshire is called "gault," as it is seen to be associated with the sands. With the debris of the chalk it forms the rich vale of Aylesbury. It runs by Swindon and Calne, in Wiltshire, into the county of Somerset. Both this deposit and that of Cambridgeshire are modifications of the true gault, which is best seen at Godstone in Surrey, as the iron and green sands are there exhibited in the most prominent manner that can be observed in Britain. The so-called gault of Huntingdonshire is identified with the Wealden clay.

WEALDEN CLAY

Occupies much space in the counties of Sussex, Surrey, Kent, and Hants, and some little in Dorset. It bears the provincial name of "oak-tree clay," and is reckoned to be a fresh-water deposit, or an estuary formation, from an almost entire absence of decided marine genera of shells or zoophytes. The formation embraces two groups, the upper or Weald clay, and the lower or the Hastings sands. It overlies the Purbeck beds, which are placed on the Portland oolite, contains thin beds of shelly limestone, or Sussex marble, enclosing fresh-water shells, and forms a type of the great denudation effected by the removal by watery violence of the once universally extended chalk range over all the Wealden formation. The deposit is very markedly posterior to the previously mentioned marine clays, which are placed in higher localities, and contain the specific organic remains to show the marine production. The deposit shows a quiet and orderly action, and may have been located by some overflow of fresh water, after the sea had retired to its prescribed limits, and had ceased to effect any marks or lasting productions on the face of the globe. The operations had not been high or elevated, and the deposit is confined to a comparatively small extent.

The Wealden or oak-tree clay is so called in the latter term from the colour resembling the decayed wood and leaves of that tree, or from the stunted and misthriven oak trees forming in many places the chief and almost only natural production of the soil. The viscous quality of the plastic and London clay is almost wholly wanting, but it retains the general nature of alumen, imbibing and retaining much moisture, and hardening by ignition. The quality is very much milder and less harsh than the clays of marine origin; but the power of production is rather lessened than increased, and the management is certainly less difficult. The upper soil and the subsoil differ little in colour or in composition in many instances, and show a leisurely process in the original formation, and also in the location of the deposit. It is not very wet as a soil, and draining is in some cases not very necessary; where it is required, the preceding directions will suffice that have been given for the draining of clay soils. The nature is dry and arid under cultivation; root crops are inadmissible, and farm-yard dung is the only substance that is able to act as a manure. Bare summer fallowing is indispensable, and in general the Wealden clay is a soil of indifferent quality. Wheat and clover are the chief crops, and the land may be much improved by a prolonged pasture of the sown natural grasses.

ALLUVIAL CLAYS

Abound in many inland situations of England and Wales, on the banks of rivers, and in narrow valleys, in which the deposits have been made by fresh-water agencies of some sort or description. The composition is much more soft and mellow than the clays of marine derivation; the productive powers are generally greater, and the resistance is less stubborn to the action of mechanical power. The low situations show the formations to be of a posterior date, and the evenness of the deposition bears evidence to a more quiet system of action, and a less turbulent state of the globe. In many cases, a more recent alluvium has covered the clay, and forms a loam or a clayey loam; but instances are abundant where the clay rises to the surface, and forms the cultivated soil. The texture is not very tenacious, nor waxy: the strength of two horses is able to plough and work the lands, and the common implements are admitted. The friability does not amount to the growing of root crops, and consequently the summer fallowing of the lands is practised. This stratum being more permeable to water than the marine clays, less frequent draining may be followed, in 6 or 8 yards, according to the visible nature of the clay. Farm-yard dung *only* is useful as a manure, as any artificial matters are repelled by the aluminous harshness of the soil, which it still retains. The best quality will admit the six years' crop course, or 1st year, fallow; 2nd year, barley; 3rd year, hay; 4th year, oats; 5th year, beans; 6th year, wheat. The inferior sorts are best used in 4th year, pasture; 5th year, pasture; 6th year, oats. The first course understands a friable capability in the soil to be prepared for beans from the oat stubble, by a partial working, and a drilling of the land.

Alluvial clays are much more pleasant to cultivate, and are more grateful for kind treatment, than the waxy stubbornness of the London formation, and the tough plastic stratum that overlies the chalk-hills of the southern part of the county of Surrey. In the latter cases, the very waxy adherence may have been derived from sea water, while the alluvial clays have been formed by the much milder intermixture with fresh water, which is wanting in the salt nature of the water of the ocean. The difference is very evident, and clearly perceptible.

ARID CLAYS

Are poor in the productive quality, and harsh in the dry aridity. They abound in the country around Birmingham, and cover much space over the coal formation in the counties of Northumberland and Durham. The colour and appearance are very various, and the formation is of different depths, and constitutional ingredients. Root crops are nowhere admitted in the cultivation, and the land does not allow any preparation in the spring for the sowing of beans. Summer fallowing is essentially necessary, though the power of two horses and the common implements are capable of working and pulverising the soils of that description. The draining must be frequent—in 5 or 6 yards apart, in the depth of 2½ feet, and filled to within 16 inches of the surface, which allows the furrow of the sub-soil plough. Farm-yard dung is the only manure, and the best rotation of cropping as under:—1st year, fallow; 2nd year, wheat; 3rd year, grass; 4th year, pasture; 5th year, oats, beans, or peas. The pasture in grass forms a vegetable earth, which tends to the formation of loam, being exactly the correction that is required by clay lands, and results from the decay of animals and vegetables. Farm-yard dung very much assists this purpose; and the great value of it arises from this property, in leaving a residual vegetable earth for future decomposition in the soil, and thereby adding to the staple of the land. And it is very much assisted by the roots and leaves of the grassy herbage, which grows on the surface of the ground, during the two or three years that are depastured by sheep.

The foregoing notice of the clay formations of England and Wales may be very appropriately concluded with a short dissertation on the general cultivation of soils of that description. The general nature is very widely different from the loamy friable clays of Scotland, and chiefly in East Lothian, which freely allow a stirring of the land in the spring, and the drilling and dunging for beans. No clay land in England permits this system—the use of beans must be in broadcast, or drilled by long coulters on a partially pulverized surface, effected by a heavy harrowing of the land on the winter tilth of an early ploughing. The London clays are most economically used in grass, and the plastic soils in the same way, where the most inveterate waxiness prevails. The modified form of it in Essex, will be best used in the two following rotations:—1st year, fallow; 2nd year, wheat; 3rd year, hay; 4th year, oats; 5th year, beans; 6th year, wheat.—1st year, fallow; 2nd year, barley; 3rd year, hay; 4th year, pasture; 5th year, pasture; 6th year, beans; 7th year, wheat. The use of barley understands some degree of loaminess to admit the growth of that cereal crop.

The Lias and Kimmeridge clays, and the Gault are harsh and untractable, and may be cropped as follows:—1st year, fallow; 2nd year, wheat; 3rd year, hay; 4th year, pasture; 5th year, oats. Beans may be added and followed by wheat on the better lands, as the quality may direct. The alluvial and arid clays, and the Wealden, are the best cropped in the same way, in two or three years in grass, according to the quality of the land.

An opinion has long prevailed in the agricultural world, that the natural grasses cannot be used on clay lands, which experience has very fully disproved. Such lands have been always said to rot sheep, which must arise from the old decaying herbage, and not from the quality of the land. Draining, and the renewal of the herbage by fresh seeds, in a course of five or six years, will remove any cause of apprehension. The writer of this essay practised the course of five years very successfully on the thin wet clays over the coal formation in South Northumberland, without draining, and no symptom of rot ever appeared. A good sward of grasses may be got on any clay lands, from producing a fine tilth by harrowing the surface of the soil that has been exposed to the atmospheric action of the winter's vicissitudes, in the spring, before and after sowing the grass seeds; the mixture of seeds being arranged and selected by the quality of the soil, and the intended duration of the pasture. The advantages that result from the grassy sward have been before stated. A very considerable part of the clay lands in England is lying in ridges of a crooked serpentine form—of unequal breadths at the ends, and often terminate in a point in the middle of the field. The working of the land in consequence becomes very awkward, and many attempts have been made to straighten the ridges, and in some cases successfully, from the ridges not being very crooked or very high; but in very many instances, with great damage, from the contrary circumstances of height and shape. By reason of long-continued gathering of the ridges, in the olden mode of cultivation, the subsoil is convex as well as the upper soil; and when the newly-made ridges took a crossing or slanting direction over those convexities, the water lodged in the hollows, and reduced the land to a state of mortar. Much loss was in many cases sustained, and the failures had the usual effect of deterring other attempts where the same obstacles did not exist. It has been recommended to make a complete alteration at once, by levelling with the spade, removing the too high subsoil to the lower places, and then replacing the top soil But this expense, would, in many cases exceed the value of the land, and has been little used. Where the ridges are not very high nor very crooked, the performance is easily effected by the plough, and the harrow filling up the hollow places; and in extreme cases, a very safe method consists in making with the plough a narrow ridge of 5 or 6 feet in width in the old deep furrows, and increasing it in breadth every following course of fallowing till it rises and fills the hollows, and levels the high ridges; when new ridges may be drawn, as nearly as possible in the direction of the old ones, and then the water will obtain a gradual flow. In this way the ground is made level, which renders easy the new ridging of the land: whereas, in the crooked form, the unevenness hinders any success in the alterations. This method may be reckoned slow; but it is the safest and most economical yet practised, being wholly done by the common plough. It was done with signal success by the writer of this essay, on the arid poor clays on the coal formation in South Northumberland.

SAND

Is the earth of rain-water, shining, rigid, rough, crystalline, not softening in water, permanently hard in ignition; but fusible into glass, with addition by a great degree of heat. It may be viewed in two chief and comprehensive states of existence—in lying on the sandstone rock, and by appearing in vast beds, as alluvial depositions. The former condition has been noticed in describing the rocks of their origin, and the latter form belongs to the geological era of which we now speak.

The first notice of sand among the geological deposits occurs in the series of sandstones, of which it constitutes the fourth formation, and constituting a part of the tertiary deposit, is known by the name of "Green Sand." It rests upon the Upper Oolite, and is covered by the chalk, and has been laid bare in South Britain, where it chiefly abounds by the denudation of the cretaceous deposit. It abounds in the green silicate of iron, and reaches the depth of 600 feet, including Upper Green Sand, &c., golt, gault, or blue marly clay, lower green or iron sand, with beds of sandy or chalky limestone. The Upper and Lower Green Sands are divided by the gault, or the argillaceous member of the Green Sand group, which has been very much disrupted and carried away by the great denudation of the chalk, and has exposed the Lower Green Sand to observation and research. The deposit is abundant in Wilts, Dorset, Sussex, Devon, Oxford, Surrey, and in the Isle of Wight, and encircles the whole of the Wealden formation of Kent and Sussex. It is most generally a highly ferruginous sand, with spheroidal or merely irregular concretions of oxide of iron, frequently enclosing a coarse brown ochre: fullers'-earth and yellow-ochre are found in it, and also fossil-wood. The depth in Bedfordshire is stated at 100 feet, and in Wiltshire at 30.

The sand-stone having been acted upon by marine water, which tore from its surface the cretaceous deposit, has derived from the aqueous sediment the ferruginous nature, which almost universally adheres to the sandy stratum. Being placed immediately below the chalk, which is generally an earthy and a feebly aggregated mass, it becomes in many instances so cretaceous as to be hardly distinguishable from chalk itself. The Upper Green Sand is often wholly lost in the chalk-marl above, and in the gault on which it lies as in Oxfordshire, producing siliceous chalky stones, with evident marks of the Upper Green Sand series. In these cases, the soils pass into other names, being loams and gravels, according as they are contiguous to the other materials which remove the character of the sandstone lands. But over the immediate beds of the plateaus which have been bared by the denudation, and are placed beyond the means of mixture, the ferruginous lands form a soil almost worthless, and below the notice of cultivation. The irony quality binds it into crusted cakes during rains, which damages vegetation, and in the early summer, the heats very often kill the expected growth of the grains. The choice manure is bones to raise turnips to be consumed on the ground by sheep, and the land then sown with winter rye. This plant covers the ground before the heats commence, excludes the drought, and produces a bulk of straw and grain, much beyond barley, which is often killed at the outset from being sown on newly stirred ground, and thereby exposed to the admission of drought. Feeding crops must be largely used, and four to one of the seed-bearing, thus:—1st year, turnips eaten on the ground; 2nd year, spring vetches, consumed on the ground; 3rd year, winter vetches, eaten on the land; 4th year, barley, with sown clovers. Or—1st year, turnips; 2nd, rye; 3rd, vetches; 4th, rape or cole; 5th, vetches; 6th, barley. Some cases require constantly feeding crops, as barley is often a total failure, and oats thrive worse. Rye is the only cereal plant that produces a tolerable bulk. These lands abound much around Reigate and Godstone, in Surrey, and command a very trifling value.

The Sand-hills of England are best seen and examined in Sussex, where the heights are continous, and extend from Hastings to Horsham, traversing the Weald in a central chain of hills, and sends off several branches, one of which extends to Tunbridge-Wells. The formation is seen, in Cambridgeshire and Huntingdonshire, rising into low hills, and forms good garden mould—passes through Bedfordshire, and enters Buckinghamshire, near Fenny Stratford. It goes on through Oxfordshire, Berkshire, Wiltshire, and into Dorsetshire; and is very strikingly displayed in the Isle of Purbeck. In the Isle of Wight, it forms the substratum of all the southern half of the island. Cliffs of it may be traced almost round the island, excepting where concealed by the subsiding ruins of the under-cliff. The sands sink below the alluvium of Lincolnshire.

The sands below the Gault is called the "Iron Sand," and is the part that has been now described. The upper part is called the "Green Sand," which name is often applied to the whole third sandstone formation, which rests upon the Upper Oolite, and is covered by the chalk. The higher part of the formation, or Green Sand, is much more alluvial in appearance than the lower deposit of the iron character; the denuding waters of the sea have retired sooner, and left the heights to the future influence of exposure, and of succeeding fresh-water inundations. The lower grounds were longer covered with the marine water, and have hence acquired the iron character. Much ground is occupied by the sandstone over South Britain; the uppermost part is of loose sand, and siliceous: the cement is calcareous, when in the form of sandstone. Beds of clay often form occasional separations in this formation. Cherts and flints are found in it, and pass into each other by insensible gradation, and owing to their hardness they generally occur on the summits of hills. The thickness varies from 100 to 300 feet, and hills rise to the height of nearly 1000 feet, as at Leith Hill, in Surrey.

The soils on the alluvial tops of the Sandhills, are very worthless for cultivation; the great depth of loose sand very quickly absorbs the rains, and leaves the surface much too dry for vegetation, consequently large tracks lie uncultivated. On lower positions, the sand is mixed with vegetable earth, and forms the land of sandy loam, which will be described under the latter designation. Therefore no directions for cropping are here given.

Sands are found lying in a vast extent of alluvial beds, and unconnected with the sand-stone sock, from which to deduce the origin. These locations are very large in Norfolk and Suffolk, and have proceeded from the mechanical action of fresh-water inundations that have succeeded the progress of the uppermost stratification. A large mixture is often seen of marl, flints, and exuviæ with the sand, which have been ascribed to the diluvial period, as being prior to the commencement of alluvium; but this difference matters little, as both eras are posterior to the chalk. The top of these alluvial beds is most generally a complete barrenness, and on lower grounds, the sand passes into loams of that denomination.

The Bagshot sand lies above the London clay, and therefore must be regarded as wholly distinct from any stratified formation, and viewed as a marine or fresh-water deposit. Conybeare places it as a marine formation, from the circumstance of the very imperfect remains of various shells, agreeing with those of the upper marine formation of Paris. It forms the sand of Hampstead, Highgate, and Hornsey; appears near Egham; extends to near Guildford, in Surrey; and from near Kingston, to about seven miles west of Bagshot, occupies a part of Windsor Forest. It forms stones for building, as the Castle of Windsor and Lord Carrington's house can testify; and the Druid stones of Stonehenge, in Wiltshire, have been raised from the deposit, from blocks, but no continuous bed. The hills rise to 463 feet in height, and are seen at Hampstead and Highgate, at Chertsey, Cobham, and Weybridge. The thickness of the bed of sand has never been determined.

The sand is siliceous, without any cement; but occasionally includes or is associated with brick earth. The nature is very poor and hungry, producing only heath and furze: hence the numerous tracts of unimproved and unimprovable wastes, which are allowed to remain even in the immediate neighbourhood of the metropolis.

It may be expected to have treated the green sand as a stratified rock in the secondary or flat formation, where it occurs at the top of the ascending series towards the alluvial depositions at the surface of the ground. But the uppermost part being so very alluvial in the nature and appearance, induced the placing together of the different sands; the upper stratification of it is laminar rather than seamed throughout the formation, as frequent interruptions occur in irony plates and shells in various directions, which render it nearly impossible to find any seams passing through the mass parallel to the bounding surfaces. A stratum, being formed by seams that are parallel throughout the entire mass, according to Professor Playfair, in many cases, requires several hundred feet of irregularly laminated sand to constitute a definite formation *of* that kind. The golt or gault beds are generally laminated, as other argillaceous deposits. The third sandstone formation, therefore, which contains the green and iron sands, with the intervening gault, must be considered as a very considerable step from the very regular stratification of the flat rocks, rising to the earthy formation of the surface of the globe, and losing the parallelism of the seams of deposits by the frequent interruptions of other substances. The undermost sandstone, or the new variegated sort, supports the best soils in the kingdom—even over the coal measures, which are contained in its matrix; the quality of its nature is frequently extended in a soil of very considerable fruitfulness. The upper formation, which we have now described, has been more exposed by its position to the violence and continuation of marine agency, which has conferred the ferruginous quality, and deleterious effect. The iron sands in Surrey, in the extreme quality, form soils of no value; another step finds weak and very thin scorching loams; and the third gradation ends in sandy loams that are still weak in quality. In these cases, the land gradually loses the irony quality, that retains the weakness of coherence, and the inability to withstand the effects of heat and drought. The green sand, or the part of the formation that lies above the gault, and immediately below the chalk, is not more favourable in the cultivable qualities; the highest parts are worthless, the descending gradations become loams of various qualities, according to the quantity and quality of the different materials that are intermixed with the original arenaceous deposit. The diluvial or alluvial beds that are not associated with any rocky or stratified formation, show the very same character of sandy soils—worthless on the highest parts, and getting better in quality as the descent reaches the lower grounds. The ochrey colour and ferruginous quality is wanting, which shows the agency of fresh water, both in the formation and deposition. The general quality of the soil is better than on the green sands.

The tertiary formation, or the deposit above the chalk, comprehends sand and sandstone, as one of its system of divisions. The stone is hard enough for the purposes of paving, is much mixed with other bodies, and contains a few marine organic remains. The sand is quartzy, calcareous, and shelly, pure and thin, and is used for making plate-glass. No part of this formation supports a soil of cultivation; and consequently does not require any further notice for the present purpose.

PEAT OR MOSS

Is one of the most recent alluvial deposits, of the origin of which various opinions are entertained. Six kinds have been enumerated. Some reckon it a primitive formation; others think it a growing vegetable, which by its decay causes an increase of the substance, and may ultimately cover the earth; and the more general opinion ascribes it to the collection and decomposition of ligneous and aquatic vegetables, brought together by the destruction of forests by wars, by the axe, and by the tempest, and accumulated by the decay of those bodies, and of the plants that were encouraged to grow by their decomposition. Formations of peat chiefly abound in moderately cold latitudes—they cover vast tracts of country in North Britain, but not much extent in England. Solid peat, cut and dried for fuel, is of a black or brown colour, extending to depths of four to twenty feet: in boggy or flow-moss, which is supplied with too much water, and prevents the consolidation, and also in many varieties of peaty earths of shallow depths, forming soils of that name, sometimes cultivated and oftener unimproved; sometimes clad with a scanty covering of heaths and coarse vegetation, and often naked and uncovered by any growing plant.

The theory of the formation of peat by the decomposition of the collection in hollow places of trees and leaves, and of vegetation, by the action of air and water, and of the subsequent growth, has been generally received as the most plausible; but mosses of great extent are found on the tops of mountains, and on high grounds, and even on declivities where no water can stand, and where no collections could be formed. Trees of a large size have been found in mosses, and also shrubs of various kinds, and the leaves and fruits are not unfrequently met with in different stages of decay. The mosses that are cropped as land are not adapted for fuel; the composition is too earthly and friable, and the circumstance of the top of many mosses being of a different colour, and spongy and fibrous, favours the opinion that the decomposition of the vegetable covering adds to the bulk of the moss, as it appears to be in a more recent state of decay than the bottom parts, which have become a black pulpy substance, from which all traces of a fibrous organization have completely disappeared. Formations of peat are found in vast beds, from 4 to 12 feet deep on level grounds, and on declivities where no water stagnates, and where trees and vegetable matters sufficient to form the moss can hardly be supposed to have grown, and where no remains of any kind are ever found. Mosses generally rest on clays and marls, and very often on gravels and clayey gravels with white sands; and theorists are driven to the supposition that there exists a predisposing cause towards the formation of that substance in the woods on which the moss commences growing, and in the climate, and in the subjacent formation, and also in the production of the plants that are adapted by the decay of their constituent parts to afford the peaty substance. But all the reasons yet given, the conjectures, theories, and suppositions, are inadequate to account for the great variety in the formation of moss. A solid moss, black and pulpy from top to bottom, is often found adjoining a formation of spongy fibrous materials alike at top, and on the substratum of clay, and both existing under no apparent difference of circumstances: the former bare and uncovered, and incapable of supporting weight: the latter matted with a thick growth of vegetables, and affording pasturage to animals. The varieties are numerous; some afford fuel wholly, others are cultivated, while many of them are unfit for either purpose, and descend by many gradations to a shallow stratum of a few inches in depth, and are called turfy, moorish, and peaty soils. The antiseptic quality of peat is well known, and preserves substances from decay. Unlike fens and marshes, the air is healthy and salubrious, which shows that the moss is not in a state of putrefaction. Moss grows and enlarges upwards, after being dug and carried away: supposed from the plants dissolving by the maceration and decay of their parts, and not by any progress analogous to putrefaction; for they remain without undergoing the usual chemical change. The gallic acid or styptic juice imparts a most obstinate antiseptic quality; it forms a full fourth part of the constituents of moss, and the other parts that might prove beneficial to vegetation are locked up or rendered useless by that noxious ingredient. The sterility of moss is ascribed to the want of the putrid fermentation; for it is inflammable and phosphorescent—qualities wholly removed from bodies that have undergone the process of ultimate decay. Moss and vegetable mould have been reckoned homogeneous substances, attended by the different circumstances in which they are placed, and the external agencies to which they are exposed; but this fact, when granted, gives no reason for moss and mould being produced in adjoining situations, where little or no difference in external circumstances would be supposed to exist. No living animals exist in moss—to form it, as tringency and dampness are required, and the water must be antiseptic, which is said or thought to derive that quality from the subsoil. But we are equally in the dark whether the astringent and antiseptic quality be derived from the subsoil, the climate, or the plants that grow on the place of formation, or from the combined influence of both these causes. The scientific reasonings of theorists are generally overturned by facts, and by the appearances of nature; and after all the opinions and conjectures that have been put forth, the more reasonable and natural conclusion would seem to be, that moss is an original formation, augmented, like other formations of a similar character, by physical agencies still going forward, and that it has been produced and located by causes, for a solution of which our wandering imaginations may ever search in vain.

All mossy soils are weak in texture, and poor and unproductive. The black pulpy peats, dry on being exposed, offer great resistance to putrefaction, and form no mixture or combination with any other body. The fibrous kinds dissolve into a loose pulverulent mass, that is destitute of cohesion, and devoid of any fertilizing property. Such formations do not suit cultivation to any extent; oats are the only grain crop that is produced, as the latitude is generally cold for barley, and for wheat the soil is altogether inappropriate. Clovers and grasses, in some cases, succeed fairly. The draining is best done by open cuts at 5 to 10 yards or more apart, as may be directed by the quality of the moss, if very wet, or moderately dry. In covered drains, stones or tiles sink in the moss, unless kept up by flag-stones, or thin boards of oak or beech. Mosses are little eligible for cultivation, which do not admit covered drainage, and are able to support without sinking the weight of the ploughing horses. In other cases, the management is troublesome, and the return precarious.

Turfy and moorish soils lie near to deep moss, and are incumbent on the beds of clay and gravel, which support the formations of peat. The depth is shallow, and the quality very weak. Where wet very shallow draining is required, and the frequency must be thickly placed, as has been before explained in the case of the thin soils on the granite formation of Cornwall. In most instances, the soils are favourable to the action of artificial manures; and the turnips so produced, being eaten on the ground by sheep, makes a good preparation for the crop of oats, with which the sown grasses thrive well. Several years of pasturage must follow as under:—1st year, turnips; 2nd year, oats; 3rd year, hay or pasture; 4th year, pasture; 5th year, ditto; 6th year, ditto; 7th year, ditto; 8th year, oats.

These soils are not frequent, and only in the North of England, and adjoining moors or mosses. The latitude is generally high and cold, which, with the natural quality of the soil, enjoins pasturage rather than cropping.

(To be continued.)

FARM-BUILDINGS OF EARL OF RADNOR, AT COLESHILL, BERKS.—These extensive farm-buildings, which have been completed within the last year, were arranged by Mr. Moore, Lord Radnor's agent, and erected from the plans and under the superintendence of Mr. George Lamb, architect. The site, occupying about three acres on the west side of the mansion and park, having the turnpike-road to the north, was chosen from local considerations, and being on rather a steep incline, presented at first sight some difficulty; but this was entirely got rid of, and turned into a favourable circumstance, by forming it into two platforms, one 12 feet above the other; the lower of which is the site of the principal buildings and cattle-yards, and the higher that of the timber and rick-yards, which are thus on a level with the upper storey of the barn and adjoining buildings; by this arrangement the necessity of hoisting the sheaves up to the thrashing-machine is obviated, and the inclination of the ground is, moreover, favourable for supplying the cattle troughs with water from the upper ground, and for the drainage of the several buildings and yards into the liquid manure tank. In the upper storey of the barn, which is 94 feet by 27 feet, is placed the principal part of the machinery, consisting of a thrashing machine, by which the grain is thrashed, winnowed, dressed, deposited in sacks, and weighed ready for market, at one operation, without any intervention of manual labour. A mill with a pair of French stones for grinding wheat or other grain, an oat bruising machine, and a chaff-cutter; these, with a circular saw in the adjoining shed, and a turnip-slicer and litter-cutter, on the lower floor of the barn, are all driven by a 7-horse power portable steam engine, in a building outside the barn wall. The engine and machinery were made and erected by Messrs. Clayton and Shuttleworth, of Lincoln. The external walls of the numerous buildings are of native stone, with Bath stone quoins, window dressings, and copins. The roofs are partly covered with stone tiles and partly with slates; and the doors throughout are made to slide, being suspended by rollers upon an iron bar, instead of being hung with hinges. Coleshill-house is interesting as an example of Inigo Jones's work. Since the Earl of Radnor has resided there, great improvements have been effected in the village: most of the old, dark, ill-arranged, and unventilated cottages have given place to well-constructed dwellings, and a school has been provided for the education of the children.—*The Builder.*

EDUCATION AND ITS IMPORTANCE TO THE AGRICULTURIST.

One of the best amongst the many agreeable writers of his time has devoted a paper to the consideration of the most popular word in his own language. He was not long in discovering *what* this was. What is the matter? What is for dinner? What is to pay? What are you eating, drinking, singing, saying, and so on? Not the least important of these every-day queries is one which may be put opportunely enough just at present. What is to be done now? asks the ruined speculator of himself, reviewing all he has done, and finding how little has come of it. What is to be done now? repeats the sober citizen, with far better heart, as he sees what has already yielded to his industry and enterprise—to what greater extent will he be justified in the endeavour to increase his business and improve his position. With the balance-sheet of the past year spread out before him, though perhaps not quite so publicly as some of our friends delight to give it, the English farmer may, like many others, put some such question as this to himself. He asks it no longer in despair or discontent. He feels that at length some yield has been returned for all he has attempted. He knows, too, that his endeavour has been a good one. That amidst difficulties of all kinds, he has done justice to his calling; that if he has again found some profit in it, that he well deserved to do so.

At such a season, in contemplating how he may yet further advance with safety, his first care becomes essentially a home thought. In asking himself what is best to be done now? he joins in the same breath with it, what is the best he can do for his family? There are many ready and anxious to tell him how he is to progress; many a correspondent of our paper eager to incite him onwards. Let our boast be, as it has been, to build up this progress on a solid foundation. Let him prepare himself so as to be able to test all that he is advised. Let him march forward with no blind confidence, with no curious awe of a teacher he obeys, chiefly because he lacks the ability to understand him. Let them rather go pari passu, and the one illustrate what the other but rarely does more than suggest.

To their credit be it said, many of the best agriculturists, even of this age, are more or less self-educated men. They have made themselves equal to each succeeding discovery and improvement as it has been brought before them. They have taught themselves all the *rationale* of artificial manures, for instance. They are becoming, day by day, better chymists, and so less likely to be imposed upon. The same may be written of their experience with the machinist. There is scarcely an implement now introduced—and verily their name is legion—but the farmer has made himself fit to appreciate. Question any of our leading firms—the Ransomes, Garretts, Howards, Hornsbys, and others—as to the pertinent inquiries so continually put to them by the practical agriculturists of the kingdom, and the valuable hints as generally received from the same class of customers. The farmers are making themselves equal to the times they live in.

Self-education, however, is after all but exceptional. Any man who has achieved it will tell you it has been the great difficulty of his life; and where one does succeed, how many fail even to attempt it! What, then, is to be done? and what, with it, is to be done for the family? The answer is but a word. The secret which is to imbue the youth with confidence, ability, and self-respect to maintain his position is—*education*. And this, be it remembered, is no longer a crime. The certain ruin of the country will no longer be declared to follow on even the labouring classes "knowing too much." It is no further to be taken in the light of a presumption that a tenant, or the son of a tenant, has borrowed a notion from Virgil, or a sentence from Cicero. There was great danger, we used to be told, in educating a boy above the station in life he was intended to fill. There is far greater danger in educating him below it. The days are gone when our sons were expected to have no higher aspirations than ploughboys; our daughters no accomplishments beyond those of a dairy-maid. Luckless Mr. Colville points the moral to our argument, while the reception he has received tells clearly enough that those farmers who do not educate their families will soon be but the exception to their fellows.

It is not our purpose, as it has never been our custom, to ask or advise too much. The opportunities for giving the sons of agriculturists a good, sound, becoming education are now ample enough. We must say, emphatically, that those who do not have as much will simply not have justice done to them. There was a day, when national schools and other plans for instructing the poor were first broached, that the rate-payer, farmer, or tradesman, as he might be, scratched his head and grumbled out that his servant's children would be better educated than his own. This will do no longer. At best, it can come to nothing more than self-accusation. At a time when progression, enlightenment, and scientific acquirements are our grand characteristics, we must not declare ourselves unable to cope with them. Not merely must we be able to advance with them, but, of almost equal importance, to withstand the many impositions attempted in their name. The mountebank who thundered forth a line of doggrel Greek or Latin to the patient who bought his pills, was trusted chiefly because he was not understood; and the wondering clodpole implicitly swallowed the bolus, not knowing or caring to know how it was to benefit him. We have gradually taught him to open his eyes, and let us not go ourselves worse armed or cared for.

The mainstay—the house, if it be built upon a rock, must be built here. Without education—without rendering the rising generation of agriculturists equal to the age they live in, their career can have no satisfactory result. What their fathers may have learnt step by step, as the road was gradually widened before them, *they* will be expected to start at once well advised upon. Let our word, then, not be thought out of season. With the new year opening upon us, with the prospects of agriculture sufficiently good to warrant all we have hinted at being fully acted up to, let us impress upon our friends, in straight-forward homely English, how great a duty it is to give the young ones a chance. There has been no man yet, however poor a start he may have had in other respects, but who thanked his parents for the blessings of a good education. Should he profit by it, your pride and pleasure is to watch his advance: should he disgrace it, your comfort is still to feel that, at any rate, you have done your duty.

BETTER LATE THAN NEVER.

It is not, I think, too late to say a little about adult education and evening schools.

With the habits and customs at present prevailing in the rural districts, it seems impossible to dispense with child labour in the fields. The rapid progress of emigration has drained the country of able-bodied men to such an extent, that in all counties farmers are obliged, more or less, to have recourse to the labour of women and children.

And the earnings of parents are such as to render it essential that the children, so soon as they are able, should help to support themselves.

How long these two reasons for the necessity of the employment of children shall continue to operate, we cannot tell; but while they do operate, and prove the source of many of the most serious of those social evils that are lamentably apparent amongst us, it becomes our duty, by all the means in our power, to contravene their results.

If we will not give—or, with our present notions, cannot afford to give—wages sufficient to enable our workpeople to send their children to school, we should endeavour to help them in another way.

If, on the other hand, we demand the children, at the hands of the parents, for the cultivation of our farms (which I know to be often done literally), then we are bound in justice to supply to them, at some period, that training of which they have been deprived for our benefit.

In either case, you see that the farmer, or the employer of child labour, is responsible.

And where such a long category of evils that demoralize our people, and prove a great annual burden upon the property of the country, is simply referrible to the one significant fact that our children are at work in the fields when they should be at work in the school, during those years when the mind and heart are most susceptible to good or bad influences, the question becomes a serious one, and we may well weigh this our responsibility.

Think—What does pauperism cost us? and how much more does criminality add to this sum? What is the annual expense to us of juvenile delinquency? Truly enormous sums! And consider, moreover, that Australia and the Cape (and soon all our colonies will do the like) refuse to be made the great cesspools of our human pollution. They tell us, in curt phrase, to "*manufacture less.*" They passionately cry, "Send us not a scourge!" When to the question, "What shall we do with our criminals?" we receive the answer, "You must keep them at home!" it is worth while, I think, to reflect upon the matter.

Now, the evils I have referred to are born of and nourished by *ignorance;* and inasmuch as the farmers of England, either by their necessity employ child labour, or refuse to remunerate adult labour with more than bare subsistence money, they are answerable for the effects of the ignorance they induce: all who employ child labour are so answerable. Amongst them there are those who recognise their charge, and endeavour, as good members of society, to fulfil their duty.

Although I acknowledge the necessity there at present appears to be to take children into the fields at the early age of eight or ten, I cannot but lament this necessity. We all know what it is to let slip the seed time. In such a case the prospect of the harvest is not laden with promise to us. There is a seed time for youth, in which, if good principles are not sown, evil ones will spring up. The general features of society and their example are ever operating on the mind of youth—ever *imparting principles*. If formative influence is withheld on our part, we cannot be blind to the fact that the laws of nature are not held in suspense or abeyance.

We gather the sense of importance attached to popular education by the ancients from the laws of Lycurgus, the celebrated Spartan lawgiver. "He resolved," says Plutarch, "the whole business of legislation into the bringing up of youth: he looked upon it as the greatest and most glorious work of a lawgiver." And, as implying the superior importance attaching to the training of the young, a Grecian poet exclaimed to the senators—"You may make laws for the people; I will make ballads for the children."

In view of the serious responsibility that thus attaches to them, in depriving the country children of their moral and spiritual seed time, the farmers should earnestly set about devising some compensation for them.

The best compensation that can be thought of is, as it appears to me, the one I have mentioned above, namely, *evening schools*. Here is a fine sphere of work presented to the young farmers of England. They can thus improve their own workpeople, reform their villages, and exert an influence upon our England—nay, upon the world—that shall never be forgotten: an influence that would spread from home to village, from village to town, and from town to the furthermost limits of population, like the circles formed in the placid pond by the plunging stone!

Time you have for the undertaking; and if you only reflect upon its glorious results, you have inclination also. Please also to take this fact into consideration—the tendency of the age is to lessen toil, and diminish the number of hours requisite to ensure animal support, &c. It is possible that the rising generation of the poor may have leisure without detriment to their pecuniary interests. The blacksmiths of Birmingham can now earn sufficient during the latter part of the week to keep them in a state of intoxication the three first days of the next week. What a dreadful spectacle would our country present, were all our industrial classes thus cursed with what should prove a blessing! It is impossible, with such an instance as this before one, not to anticipate the general relaxation from toil with much *fear* as well as hope. That this great boon which God has designed in His mercy to give us, through the ingenuity of man, be not lost to us—that this unprecedented blessing prove not our sure ruin—we must, looking forward to probable consequences, prepare the agricultural labourer, the artizan, the mechanic, for its right use.

You and I, my good reader, must help in earnest in this great work of preparation. Some can lend the room, some can furnish candles and fuel, some can teach; and as for scholars, your benches will be crowded before your intentions are generally known—crowded with boys, mature adults, and old men—all eager competitors in the race from which the usages, the prejudices, and the something else of society has hitherto precluded them! F. R. S.

ON THE USES AND APPLICATION OF LIME TO SOILS.

At this season of the year, it is scarcely possible to find a more profitable employment of team-labour than in leading lime for the use of the farm. Wherever it can be obtained at a moderate price, this leading ought to take place, as a doubt can hardly arise respecting its beneficial uses to almost every variety of soil. It should be carted into convenient heaps, which may be of considerable size, provided no rain or moisture falls in sufficient quantity to slake the surface, and cause a crust; but so soon as the surface of the heap becomes wetted, a fresh one must be commenced, and so on throughout the leading. If these heaps are nicely rounded up, and a good coating is once formed, either from the surface slaking or by being covered with soil, they will keep uninjured for several months, and when taken out they will generally be found to be "air slaked," and the finely powdered lime in its hottest and most effective state for application to the soil.

Its Uses as applied to the Soil.—It acts very powerfully in its caustic state in decomposing animal and vegetable matter in the soil. It does not altogether lose its causticity by coming into contact with the moist soil, or by being moderately diluted with water. Professor Way remarks, "We hope to see the time when this manure will be equally and efficaciously distributed over the soil *in solution in water*."

It is a Stimulant.—It acts in this way surprisingly upon the dormant powers of the soil and the inert manures abiding therein. Liebig says, "Lime, in combining with the elements of the clay, liquefies it, and, what is more remarkable, liberates the greater part of its alkalies." "The cerealia require the alkalies, and the alkaline silicates, which the action of the lime renders fit for assimilation by the plants. If, in addition to these, there is any decaying organic matter present in the soil, supplying carbonic acid, it may facilitate their development, but it is not essential to their growth. If we furnish the soil with ammonia, and the phosphates, which are indispensable to the cerealia, with the alkaline silicates, we have all the conditions necessary to insure an abundant harvest. The atmosphere is an inexhaustible store of carbonic acid."

It neutralises injurious Acids in Soils.— Soils subject to flooding or stagnant water are said to be *sour*, as containing too much vegetable acid. Lime qualifies the vegetable and other soluble substances, and occasions their conversion by atmospheric action into nutriment for plants.

It is an Alterative.—This is one of its most powerful properties, even to changing the very nature and texture of the soil. It operates by causing fermentation in the soil: the minute particles of finely divided lime insinuate into every crevice of soil, causing its disintegration and separation, and the more rapid decay of vegetable matter, which eventually makes it mellow and friable. Morton says, "Lime also acts powerfully on any irony matter in the soil; and on gravel sands, and clay soils of the friable diluvial formation, and on the soil of the plastic clay, the new and old red sandstone, and the basaltic formation, the effect produced by the application of lime is very great." Lime has power to decompose the mineral portions in various soils, and is the great source of benefit by providing the constituents of magnesia, potash, and soda, so important to vegetation. Lime is the cause of a vastly increased produce: it is not in itself a manure, but its power and action upon the soil are so great as to extract "the very soul of vegetation," and is the surprising medium of converting not only manures but the ingredients of the soil itself "into living vegetables."

One other virtue, and not the least, remains to be named: it is said to destroy worms, slugs, beetles, &c., &c.

Its Application: the Quantity per Acre.—This must depend upon the soil, its nature, and fertility. In all cases, however, it is requisite to apply a sufficient dressing, as most likely to promote the objects in view, and as named above. Small dressings will not do; and it is very possible to apply too much, and thus to stimulate the soil beyond its natural powers, and, in such case, to render true the old adage, that "lime enriches the father, but beggars the son." The result of much and general experience appears to have decided that from 80 to 180 bushels per acre is a fair and efficacious dressing for light land, and from 200 to 350 bushels per acre ought to be the dressing for clay and other strong lands, subject to the frequency of repetitions, which ought to be at long intervals.

The Time of Application.—If the object of the occupier is to derive the most benefit from the use of *caustic lime*, then undoubtedly it ought to be applied when the soil is freest from moisture, and the lime itself in its most caustic condition. Of course, so soon as slaked lime comes into contact with moisture it is no longer a powerful caustic, but is much reduced in its operation, and, if much diluted, becomes effete and mild in its character, and has only the main properties of limestone finely comminuted. It ought then to be applied in the hottest and driest season of the year, and on soils thoroughly well fallowed and finely pulverized. It should be put on the soil as quickly as possible, and be immediately ploughed in at a shallow depth, as its tendency is to work its way to the subsoil. It will thus act most efficaciously on those vegetable and animal substances with which it comes into contact, and at the same time acting powerfully in causing what is commonly called "fermentation of the soil," so essential to healthy and luxuriant vegetation. Thus the roots and fibres of weeds and other vegetable matter, and also all animal matter, including the innumerable eggs and larvæ of insects (grubs, wireworms, &c.) is converted by decomposition, and through atmospheric influence, into most nutritious food for the future plant. If the object of the occupier, however, is merely to supply an exhausted soil with lime, then the time of application is immaterial, nor does it appear necessary to use caustic lime, or even lime at all, except that lime is a more finely divided powder, and capable of intermingling with the soil more effectively; in other respects, chalking or marling may be adopted, and, while saving much in cost, will do nearly as well. From 12 to 16 cart-loads of 36 bushels is a fair average dressing per acre.

Lime may be very beneficially used on grass land immediately before breaking up: it acts powerfully in decomposing the grass sods and other vegetation; but it ought never to be used on pasturage, except in compost; otherwise, it will destroy much fine herbage. It is sometimes, however, used to advantage in its caustic state to destroy a coarse and unpalatable grass or large tussacs, which it will burn up, and thus make room for finer herbage.

Lime should not be too frequently applied to soils: one good dressing in fourteen years is sufficient. It should not be applied to calcareous or limestone soils: "it is carrying coals to the coal pit."

ADVANCE OF AGRICULTURE.

"Farming is a matter of *observation*," says many a practical man of business; and it is undoubtedly true that agriculture, whether viewed as a science or an art, can make progress only in proportion to our intelligent observance of its details. But, in the mouths of many industrious people, this axiom has been too often intended to throw discredit upon the efforts of those more thoughtful and reflecting students of agricultural truth who would, if possible, deduce *rules* for common practice out of the recorded experience of the field and farmstead—who believe, in short, in the feasibility as well as desirableness of *codifying* (in essays and treatises) those results of practical farming which are treasured up in our agricultural literature, and weekly imprinted in the pages of our journals. We rejoice, however, that a large class of tenant-farmers do value these literary efforts of some among them; displaying eagerness for their newspaper, not merely because it may bring them early and accurate intelligence of markets and prices, but also because it conveys the latest information upon every question of rural economy, and excites to the discussion of all facts, experiments, and opinions likely to advantage their profession.

Such approbation is the encouragement which agricultural writers look for in all their endeavours; and when presenting to public notice any novel feature of husbandry, any case of unusual results, or example of rare enterprise, they hope for co-operation in canvassing plausible wonders, "proving all things," and "holding fast that which is good." There is one department of our labours, however, to which the minds of readers are certainly less attentive than they might be with profit—namely, that consisting rather of *analysis*, or of the criticism of present practices, and proposals in relation to the accumulated experience of the past. At times, our articles are written under the belief that *it is not by incessantly gazing in one direction that most is to be seen;* that it is not by a man's strictly confining his attention to his own affairs, without a thought of what others may be doing, that the greatest insight into those affairs can be obtained. It is utterly needless to insist upon the benefits of a watchful observance of what other classes are doing, in these days of rapid transit and free intercommunication. We are all anxious enough to get hold of any new fact that promises to help-on our business. We value descriptions of new implements, new processes, improvements in any way brought to bear upon the work of cultivation; county reports; examples of peculiar practice; the advice of thoroughly capable men upon the growth and management of crops, breeding and feeding of live stock, &c.; and, in fact, any treatise, practically dealing with any topic of the business or science of agriculture, is welcomed and appreciated. But we fear that a different reception sometimes awaits that class of teaching—equally valuable in its place—which, instead of contributing to our stock of data, or adding to the always over-burdened agglomeration of private opinions about those data, endeavours to dissect and scrutinize the mass of information continually being collected, and thus, by smelting the rough ore, bring out, if possible, the shining fragment of knowledge which may be all that is really new and precious. Such analytical labour, demanding for its right performance a comprehensiveness of mind and fulness of knowledge unnecessary in the mere pleasing description of a model farm, or the clear statement of facts and figures relative to any improvement, we hold to be highly valuable to the agriculturist, and deserving of the perusal and study of all who prefer the kernel to the husk, and who choose rather to lay hold of the essence and principles of a subject ready-developed for their use, than themselves work out the truths with great difficulty and imperfection.

Without frequent self-examination and retrospection, how could we advance surely and steadily in any branch of study? And in agriculture, where everything like the theory or principle of operations exists in such a scattered and multiform condition-one would have supposed that increased import, ance would attach to this kind of examination and estimate of its proficiency. We therefore entreat the earnest attention of our reflective readers to such contributions and articles in their farming periodicals as may partake of this character, whether they recapitulate the various achievements made from time to time, or simply suggest different tests by which to ascertain the amount of progress that has been accomplished.

Farmers never were celebrated for book-keeping; but unless they take stock, as it were, and strike balances in their art, how shall they know (any more than in private business) how its affairs stand, which department yields most profit or loss, and which is susceptible of greatest reformation? We ought continually to recur, in remembrance, to past stages of our career, measuring the last intervals we have passed over, and so prepare our next steps and adjust our future direction. But many of that class of the community who have "put their hand to the plough" seem to think that (literally) they ought not to "look back." Nevertheless, trusting to our readers to sanction our views, we consider that a sufficient number of thoroughly practical expositions of field operations, and papers on all seasonal topics, are furnished in these columns, to warrant our occasionally treating of the art of cultivation in the manner referred to.

Most farmers, if challenged as to the progress made by their profession, will recall the now-antiquated customs of their own youth or of their fathers' lifetime. They will tell of the horse-power thrashing-machine, the drill, and other implements, as having been complete novelties, regarded by farmers with disfavour, and by the labouring people with violence. They will relate the story of the Woburn and Holkham "sheep-shearings," and Mr. Coke's establishment of the great "Norfolk husbandry"—of heaths and downs grubbed and brought into tillage by the expenditure of vast sums in chalking, liming, bone-manuring—of fens and marshes drained by wind, steam, and the excavation of immense canal and river works—of clays made porous with tile drains—of sandy warrens converted into good earth by dressings of clay—of fences removed from the rich land they encumbered—of shelterless wilds made improvable by planting—and of new and better systems of farming introduced by such improvements. They will come down to still later advances — to the general employment of steam-engines for thrashing and winnowing— to great changes in the farm-yard in the providing of better buildings and apparatus for feeding—the supply of artificial foods and manures on an immense scale—the continued successes of skilful breeders in producing profitable animals—the unweared industry of implement manufacturers in perfecting every old order of tool, and in giving us new ones like the clod-crusher, scarifier, and broad-sharer. Some will even launch out in praise of the water-drill, the corn horse-hoe, the root-pulper, the steam draining-engine, and other modern and successful inventions; while others will refer to our journals, and essays, and lectures, as comprising within them the germs of a grand development, future yet near at hand, of our agricultural powers.

Now, a mere general consideration of these things is interesting, and an expanded history of the changes as they occurred has still greater attractions; but, after all, this is not what we understand by an investigation and estimation of the position we hold in relation to our past career, and does not give us an adequate idea of what we have achieved, or of what still remains as a task to be overcome. It is not enough even to take one of the *worst*-farmed districts, place it beside one of the *best*, and say, "So many or so few years ago both these tracts were alike backward in condition : judge, there, fore, by the one *in statu quo*, precisely how much this other must have surpassed it." Histories are for volumes, not for newspaper columns; and illustrations only are not sufficient. Our idea is, that, as in Humboldt's "Cosmos," no branch of natural science is treated of singly, but every subject discussed in relation to all these sciences; so, to afford an analysis of our present agricultural proficiency, each important division of the subject should be considered in its past and present relations, and in its bearings upon all other departments of husbandry. To fulfil at least a portion of this task, we shall further address ourselves.

FARMERS' INSURANCE, AND THE USE OF THE STEAM-ENGINE.

What is it that we should receive as the most satisfactory evidence of agricultural progression? What, on our visit to a farm homestead, would be the most likely, as the most directly to assure us that the occupier was making the best of his means? There are few who would divide upon the answer. That power which has become the essential sign of the age in which we live, no longer denies its services to the farmer. Science and practice, hand in hand, confirm the many advantages of which its agency is capable; and thus the use of steam is becoming as prominent a feature in the business of the farm as it is in almost every other business in the kingdom. The implement-maker's great pride is centred in this engine. The architect's first care is to provide for its reception. The lecturer or essayist at once assumes its aid is indispensable, and that to go on at anything like the pace we should go, we must here again travel by steam.

Is there anything to prevent our doing so? Once upon a time, certainly, such an innovation, any such economy of labour and time might have raised a riot in the district to which it was introduced. These days are, however, long since passed away. Landlord, tenant, and servant have each alike become more enlightened, so that the use of such a power as that we now speak of is liable to but little prejudice or opposition in its application. Our first duty must be to see that this power is not abused, and that it is not made answerable for offences, which if "proven" would go far to curtail or retard the increasing opinion in its favour.

The first necessity, be it remembered, in the use of machinery of almost every description, is care and vigilance. To the want of this must be attributed, more or less, nearly every serious accident resulting from the employment of this kind of agency. The law wisely holds the want of any such forethought to be in itself a crime; though the punishment but too frequently comes self-inflicted on those, who by their carelessness have only courted what they receive. In the application, then, of steam-power to the purposes of agriculture, there is no such impediment as this same carelessness. In the uses to which it can be brought, there is scarcely anything to fear but the want of common care. There is nothing either which will carry with it so certainly its own terrible reproof as this lack of habitual caution. The chief sufferer, of course, will be the man most directly concerned, the one who has the most to lose; and it is accordingly to him and his that we would more particularly confine ourselves.

In a circular emanating from the Directors of the Farmer's Insurance Office, and addressed generally to the Members of the Royal Agricultural Society, we find great stress made on "the necessity for greater care in the use of portable steam engines." "The great amount of property," so the letter runs on, "lately destroyed through the recklessness of persons entrusted with the management of them, must have a tendency to discourage the use of so important an instrument in farming operations; and if greater care be not observed, it will not be possible for any office to continue the insurance of farming property at the present very low rate." We have here, in this one sentence we quote, both the crime and the self-punishment already referred to. It may be very satisfactory for a farmer to know, as every prudent man should know, that his property is insured; but even putting aside the many accompanying injuries a fire would inflict on him, his culpability is not merely punishing others, but equally himself. If this carelessness is to continue, if "a great amount of property is still to be destroyed through recklessness," the greater, of course, the rate at which insurance must be made. There is a community of interest in companies of this kind far greater than many at the first glance might be inclined to imagine. It was never intended, however, where all united to share any unavoidable suffering that might happen to one, that the same sympathy should be extended towards conduct which, if much longer persevered in, must destroy that protecting influence already so sadly abused.

Let us follow this timely warning a little farther, and learn what each may do towards removing this growing evil. "So reckless, indeed, are some of the persons entrusted with the engines, that they regard neither the direction nor force of the wind, the immediate proximity of loose straw or other combustible material, and use wood for generating the steam, utterly regardless of the streams of sparks which threaten to ignite all the surrounding property." We all know the off-hand airs of smartness and consequence which the travelling enginemen are apt to assume. Their sins are, however, no longer on their own heads. Wherever their scene of action may be, it is the property of another that is at stake, and it is to his control that these men are all immediately subject. If, then, they are suffered to act in defiance to the rules of all common caution, the farmer has only himself to blame. If the difficulties of insurance increase proportionately as the necessity for it increases, the farmer has none to complain of but his own class. A company that was originated distinctly to protect him is only doing its duty still further in warning him against the continuance of practices too long overlooked or disregarded. The question, like many others, is no more an individual than a national one. It becomes all alike, equally in respect for our own interest as that of others, to take a share in suppressing an abuse that is in reality but little short of a disgrace.

Let the use of the steam-engine, then, be no longer a paradox. Let us not be taught to regard its aid as that of a Mephistophiles we called in to serve us, but who only came to destroy us. The great principles of modern agriculture are essentially involved in the consideration of this subject. It is the duty of every good farmer to avail himself to the utmost of those improvements science and practice have combined to sanction. It is equally his duty to insure himself against the hazards to which his business is proverbially subjected. Surely the one case should be no contradiction to the other. As it is, even, the fault is no distinct charge against the farmer. It is rather, on the other hand, one working in every way against his welfare, that a word or two from him may immediately correct. The caution, indeed, which we here disseminate, may be considered as coming directly from his own body. The Direction of the Farmer's Insurance Office embraces the names of many deservedly distinguished agriculturists. There is scarcely a county in the kingdom but has its representative here; and it is, no doubt, acting on the experience of those who have had full opportunity of observing the evil, that the management now speaks. The common good demands that it does not speak in vain.

ON THE MANAGEMENT OF YOUNG HORSES.

SIR,—The foals having been provided for through the first winter, towards the middle of May it will be expedient to make arrangements for their summer's keep. This must to a certain extent be regulated by circumstances. If the breeder is provided with convenient paddocks, they are by far the most desirable situations; and whether they will produce a sufficiency of herbage must depend upon their size and the condition of the land. Those which are bare of keep are by far preferable, as the requirements of the inmates may be always supplied with hay, lucerne, vetches, or clover; and an occasional change of food has already been recommended. The constitution of each animal should be consulted, and likewise the purposes for which it may be calculated. Some will require a moderate allowance of oats throughout the summer months. The benefit which young horses will obtain from corn will be more than equivalent to the expense, especially those which are promising to make hunters of the first class; but for hacks and carriage horses it can only be necessary under particular circumstances. It is of the utmost importance to watch the progress of these animals; for it is as necessary to guard against an over accumulation of fat, as the other extreme. The month of May or June is the most seasonable period for performing the operation devised to prevent colts from propagating their species. There is a phenomenon attendant upon this, regarding the cause of which I never could obtain any satisfactory explanation; nevertheless, general observation confirms the fact that colts which have been castrated at a season of the year when their coats are long and rough, are never fine during the winter, whereas those which have been operated upon soon after they have shed their coats, almost invariably look well. This should not be delayed too late, from causes which it is not necessary to enumerate, and likewise that the patients may recover before the hot weather sets in.

Many persons are of opinion that it is unnecessary to administer physic to foals and young horses; but a few observations will dispel that notion. After a foal has been weaned and deprived of its mother's milk, the liver very frequently assumes an inactive sluggish disposition. The coat indicates this by its harsh unhealthy appearance, and the animal gives evidence of being what is termed hidebound. Very often the legs will fill from an irregularity of the circulation, consequent upon the state of the liver. In such cases one or two mild doses of aloes become indispensable. Diuretics are of no use under these circumstances, their action being on the kidneys and urinary passages, which are not the seat of disorder. For foals recently weaned, one drachm of aloes with an equal portion of ginger and of soap is the proper quantity; but if that does not relax the bowels sufficiently, the proportion of aloes may be increased on the second occasion. A slight dose only is required, because the aloes being supposed to act primarily on the liver, it is merely necessary to stimulate that organ to its healthy action. The only restriction necessary in the diet is substituting bran mashes for hay during the twenty-four hours preceding the time of administering the medicine, and carefully providing the animal from the effects of rain; otherwise, if the weather be favourable, no danger need be apprehended from the usual enlargement in the paddock or field during the operation of the physic, while the exercise will assist the desired result. Foals which have been fondly treated when with their dams, and subsequently, will not occasion much trouble in administering the ball. When they are weaned a light head collar or halter should be put upon their heads, and, being accustomed to that, the ball may readily be given by placing it on the end of a piece of whalebone or cane. Those foals which have been fed upon an abundance of grass, are very subject to be troubled with worms; and some pastures are very liable to produce them. Many remedies have been adopted for their expulsion, but I have never found anything so effectual as calomel or emetic tartar if properly administered: that not always being attended to, has led to the conclusion that the remedies are not infallible. Neither calomel nor emetic tartar should ever be given, if the expulsion of worms be intended, with the medicine administered to work it off; nor should soap, or any other alkali, form a portion of the ball, as those substances counteract the effect by decomposing both calomel and emetic tartar. The plan which I have always found successful to dislodge worms from horses, at any age, has been as follows, apportioning the quantity of medicine to the age and constitution of the subject. Keep the patient without any kind of food six or eight hours, when the appetites of the insects will become keen. A small quantity of bran mash is then offered to the animal, in which is mixed the calomel or emetic tartar: for a foal the proportion is from twelve to fifteen grains, and for a yearling from fifteen to twenty. This dose is repeated after an interval of ten or twelve hours, during which period no other kind of food must be presented; otherwise the worms, seizing upon the nutriment which it affords, will not be destroyed. Six hours after the last dose has been given, it must be worked off with linseed oil or aloes. The quantity of the former is from four to six ounces; but if aloes be preferred, the dose will be from one drachm to one drachm and a-half, which should be dissolved over the fire in a small quantity of oil or lard, and made into a ball with ginger and treacle. The quantity of calomel or emetic tartar for horses at a more advanced age may be augmented to the extent of sixty grains; but for two and three-year-olds, from twenty to thirty grains is sufficient, with the purgative remedy in proportion.

When horses are turned out to grass in the spring of the year, the succulent nature of the food causes them to purge, often to a great extent; this is considered by many persons a most desirable event—a great misconception. The herbage is overcharged with sap and moisture, of a crude, acrimonious nature, to such an extent that all cannot be taken up by the organs destined for the secretion of urine, or by the absorbent vessels of the body; the superfluous fluid therefore passes off through the intestines with the indigestible particles of food, and thus the watery fæces are thrown off. Flatulent colic or gripes is a frequent attendant. The system is deranged; but the mischief does not terminate here. If the purging continues, a constitutional relaxation of the bowels is established, very debilitating to the animal, and often difficult to control. I am so decidedly opposed to an unrestricted allowance of luxuriant grass to horses at any age, that nothing could induce me to give it to them. I may not be able to enlist all my readers as converts to the practice; I trust I may a great many of them. After the second year, hay should form a considerable portion of the daily food, in summer, to every animal intended for hunting or riding. If a horse is supported entirely upon the grass which he collects in a rich pasture field, or upon that which may be cut and carried to him in his paddock, he must consume a much greater bulk than of hay in an equivalent time, to afford nourishment to the system. Grass being very full of sap and moisture, it is very rapidly digested, consequently the horse must be continually eating it. This distends the stomach and the bowels, and the faculty of digestion is impaired; for the digestive powers require rest as well as other organs of the body, if they are to be preserved in perfect condition. By the custom of grazing, the muscular system is enfeebled, and fat is substituted. This may escape the notice of superficial observers, who do not mark the distinction between the appearance of a fat and a muscular animal; who conceive so that the bones are covered, and the points are rounded, all that is requisite has been attained. But that is a very fallacious impression. Let any person who is sceptical on this point ride a horse in the summer which has just been taken out of a grass field, along with another kept on hay and corn, at the moderate rate of seven or eight miles in the hour; the grass-fed horse will sweat profusely, while the other will be perfectly cool and dry. This proves that the system of the one eating grass over-abounds with fat and those portions of the blood which are destined to form that deposit. Those who advocate grazing will no doubt exclaim, "Oh! this is a test of condition, which is not required in young and growing animals." I beg to state that it is highly important, if the acme of condition is to be attained by animals of mature age, that the growth and gradual development of their frames should be composed of those healthy and vigorous elements upon which the structure of future condition can be raised. Animal substances are to a very great extent subservient to the nature and quality of the food with which the individuals are nourished. I believe farmers would find it much to their advantage if they were to consider this subject with reference to feeding cattle and sheep, so that they might select those kinds of food which abound with properties more conducive to the production of flesh than fat. There is no kind of food which the horse consumes which has not a tendency to deposit some portion of fat. It is a substance which must exist to a certain extent; but as it is muscular power, not a predisposition to adipose rotundity, which enhances the value of the animal, the reasons are obvious what guide should be taken in the selection of food. I have on a former occasion hinted the propriety of bruising the oats, and will now state my reasons for doing so. The first I will mention is economy. Three bushels of oats which have undergone that process are equivalent to four which have not, and the animals which consume them derive greater benefit. Various schemes are adopted to induce horses to masticate their corn, all of which are ineffectual. Scattering them thinly over the surface of a spacious manger, mixing a handful of cut hay or straw with each feed, and such like devices, will not cajole the animal to the performance of mastication. A horse that is disposed to bolt his corn, however carefully it may be spread along his manger, will soon learn to drive it into a heap with his nose, and collect as much with his lips as he thinks fit before he begins to masticate. Whatever food enters the stomach of any animal, and passes away in an undigested form, may be considered as so much dross or extraneous matter, which, not having afforded nutriment, is prejudicial to the creature which consumed it. A mistaken notion of economy is often the incentive to turning horses out in the summer, to be entirely dependent upon grass for their support. A few remarks will surely dispel that error. Twenty-two bushels of oats—allowing one bushel per week from the 15th of May to the 16th of October—may be estimated as the produce of half an acre of land, and half a ton of hay that of another half-acre, although a ton and a-half per acre is not more than an average crop. It requires at least an acre of grass land to support a horse during the period above-named.

Considering the important functions assigned to the legs and feet, upon which a great portion of the horse's value depends, it is a matter of some surprise that more attention is not bestowed on the subject. There are many breeders who never think of inspecting them till the animals are about to be broken, or, if they observe any imperfections, they leave the remedy to its fate. The legs of young horses may be justly compared to willow twigs; you may train them to almost what form you please. By careful and judicious treatment many defects may be relieved or corrected, if attacked in the earliest stage, before the parts have assumed an unyielding texture. Many of the imperfections to which the form of the leg is susceptible, may be traced to a portion of the hoof having been broken, worn away, or chipped off. In the event of such an accident, the opposite side of the foot grows more luxuriantly, and the weakest portion, or lower side, having to sustain an increased weight, an uneven bearing for the foot is established. This will assuredly cause the leg to grow crooked, and very probably occasion a turning in or out of the toe. The irregularity of shape is often seen in one leg, while the other is well formed. The pastern joints, in many cases, evince a disposition to grow too upright, or on the other hand to assume too much obliquity. The same principle which accidentally causes a limb to take an unfavourable growth or form may be adopted to restore it to its proper shape, providing it is attended to in time. Thus, if the inside of the near forefoot of a colt or young horse be broken off or worn down, it will cause the animal to tread more heavily on the inside than on the out, and the leg will become bent in consequence. To correct this it is only necessary to reduce the superabundant portion of the foot with a drawing knife or carp, so that the limb may have an even bearing. When the pasterns grow too upright, the heels require to be lowered; and the toes of those which are too oblique must be shortened. The texture of the hoof varies considerably in different animals. In some measure it is constitutional; and it is likewise affected by the state or condition of the land upon which the animal is reared. Before shoes are applied, if the land be dry, the hoof is very liable to be broken off at the edges; and if neglected they will shell off, and frequently occasion soreness—sometimes even inflammation. To obviate this, the part should be rounded a little with the rasp, and the foot dressed with ointment composed of tallow, fat, or lard two parts, tar one part, and treacle half an equivalent of the latter. These being melted together and applied warm on the soles and hoofs of horses at any age, will be found to promote the growth and toughen the parts effectively. If the land be very dry, it is advisable to throw water on some particular spot, where the animals may be induced to stand occasionally in order to keep their feet in a healthy state.

By adopting a regular system, and examining the legs and feet of every horse, young or old, once a month, attention to these little matters becomes habitual. When the vast importance of healthy feet is considered, the trifling item of trouble must necessarily vanish. Incipient lameness is very frequently established at an early period; although it may not be detected till the animal is shod and put to work, when the unfortunate blacksmith, shoes, and all such devices, are summarily condemned. Thrushes are not unfrequently a predisposing cause of lameness; but they are commonly thought lightly of, unless they give palpable evidence of inconvenience. Exposure to wet and filth will often produce them; and they are in some measure similar to the foot-rot in sheep. At the same time they are more controlable and subservient to appropriate remedies. When the properties of the frog, the seat of this disorder, are considered, no surprise can exist that they should be very frequently the predisposing source of foot-lameness. A thrush may be briefly described as an ichorous, fœtid, and corrosive discharge, proceeding from the frogs. When this exists for any length of time in the foot of a young animal, it interrupts the ordinary secretions and development of the sensible frog; by its discharge it promotes absorption, causing the internal part to assume an unhealthy degree of hardness or consistency and thereby affects its elasticity. The frog, it must be observed, is destined to prevent concussion, which in its healthy state it is admirably adapted for; but if it is injured, so that its character and nature is changed, when the horse is put to work soreness of the feet ensues, and often inflammation, which gradually increasing, the animal becomes quite lame, and is therefore nearly useless. As attention to the feet of young horses involves the necessity of handling, and such familiarities as will render them docile and tractable, two important objects are secured.

I am, sir, your most obedient servant, CECIL.

LEICESTER SHEEP.—RECENT AWARDS.

Your correspondent, under the signature of "Nostaw" (or 'Watson" reversed), in an article headed "Scotch Breeders of Leicesters in a Fix," refers to the contradictory principles upon which the premiums have been awarded to Leicester sheep at the meetings of the Royal English and Highland Societies at Lincoln and Berwick, and at other local meetings of the latter society in Scotland, ascribing that result to the wrong selection of judges, and asserting that, in Scotland, none but Scotch judges ought to be employed, as knowing best what suits their country, and adding, "Who ever heard of the English Society selecting judges from this side of the Tweed?" This seems to be rather a short-sighted view of the matter, leaving the principle upon which the diversity of adjudication rests untouched, and losing sight of the fact that the premiums in question are offered, not for sheep which in the opinion of certain parties "are most suitable to the country"—which one might apply to Cheviots, another to blackfaced Highlanders, and so on—but to the particular and especial *breed of Leicesters*. The question, "When do we hear of the English Society selecting judges from this side of the Tweed?" has little connexion with the subject, but may be answered by another—"How many meetings of that society have been held, at which some of the judges were not from Scotland?" The real question, however, is, What are, and what are not considered to be sheep of the *pure Leicester breed?* for if we omit the word "*pure*," and admit of crosses, then the distinction of breeds is at an end. The Royal English Agricultural Society settles this point by offering one set of premiums for sheep of the Leicester breed, and another set for sheep of any other long-woolled breeds, comprising Lincoln, Cotswold, Gloucester, and all other long-woolled sheep, except Leicesters. Here, then, the duty of the judges is plainly marked out. No such distinction, however, exists in the rules of the Highland Society, which seems to consider all sheep not of the Mountain or Southdown tribes to be Leicesters, thus leaving to the judges to settle the controverted question, of which are Leicesters, and which are not, or, as "Nostaw" proposes, to bestow the premiums on such as in their opinion are best suited to their own country or locality. This, of course, opens a wide field for controversy, lays down no definite principle of action, and leads to the contradictory results which occurred at Berwick and other meetings of the Highland Society. With regard to the awards under this head at Berwick, they were just what was to be expected, considering that they were offered for Leicester sheep, and considering that two at least of the three judges were such whose opinions of Leicesters were formed from their knowledge of that breed as handed down from Bakewell by the Collings, Thompsons, Burgesses, and Buckleys, and long maintained in purity on both sides of the Tweed—at Ladykirk, Edington, Bogend, Highridge, Milfield Hill, Norham, Lilburn, and other places. On examining the lots competing in that class at Berwick, and hearing who were the judges, I anticipated the decisions they came to in every instance but one, because I was of opinion that they would consider that many of the sheep exhibited there, though splendid specimens of their kind, could not be certified to be pure Leicesters. I am aware of the argument that a change of locality and climate is said to produce such a change in the appearance and character of animals, though no mixture of other blood has been introduced, as to effect a great alteration in their size and shape, and in the quality of their wool. I certainly have seen a very marked alteration in sheep that were bred in Northumberland, and had been located for three years in the deep grazing lands and the humid atmosphere of Ireland. Whether such a difference is likely to be effected by a change from Nottingham to the Tweed, I am not prepared to say. Mr. Douglas and those gentlemen who have introduced into their flocks sheep from the native country of the Leicesters will be best able to solve the problem.

Turning, however, from the award of premiums, always in some measure dependent on the taste and fancy of individuals, to the important and ultimate object of all breeding—namely, the greatest amount of profit to be derived from it—I have never found reason to alter an opinion formed upon the experience of former years, when I was owner of 1,000 breeding ewes (though I have none now), that, looking to the quiet character of that breed, their aptitude to fatten, quality of flesh, and early maturity, tending to the frequent turning over of capital, there is no other which leaves so great a profit per acre on land that is suited to them, although others may greatly exceed them in the weight of carcase. I do not take into the comparison the case of stall-fed sheep, where great individual weights are the object, but of flocks of considerable size, and with ordinary keeping; and certainly this opinion is strengthened by the fact that, in the northern markets at least, sheep of 20lb. per quarter sell for more per pound than those of 30 and upwards. JOHN GREY.

Dilston, December 6, 1854.

THE CHEMISTRY OF MANURES.—LIME.

SIR,—I beg to forward you copies of two letters on Lime, which, although it has long been in use, I am afraid is not thoroughly understood by the farmers generally in all its bearings to agriculture. I have endeavoured to make them as plain as possible, and if you should deem them of sufficient interest, you are at liberty to make what use you like of them. Farmers will often read these kind of matters in a newspaper when they will not sit down to study the subject from chemical works. Yours, truly,

Nov. 29. SAMUEL PARR.

TO THE FARMERS OF NOTTINGHAMSHIRE.

GENTLEMEN,—The use of lime as an application to the soil has been long known and recognised for its value. The most abundant form in which it exists is as carbonate of lime, or mountain limestone, one hundred pounds of which, when pure, contains about 44 lbs. of carbonic acid and 51 lbs. of lime. Lime, in the process of burning, loses the whole of its carbonic acid, after which one ton will weigh about 11½ cwt. I am now speaking of a very pure limestone; such, for example, as that of Crich, and it becomes a question what such a lime can do for the soil, and in what way is it to benefit vegetation? That lime is contained in plants every analysis proves: the quantity of course varies in the different species. Some plants, such as lucerne, clover, &c., contain so much lime that Liebig has given them the designation of "lime plants;" others contain less, but it is required in some degree by all.

Lucerne, clover, beans, peas, and potatoes may be considered the principal lime plants usually cultivated in this country. The potato, however, belongs only to lime plants as regards its leaves: the tubers (which contain only traces of lime) belong to the class of potash plants.

What is generally termed "clover sickness" arises in a great measure from a deficiency of lime in the soil. A crop of clover (say about two tons) removes 130 lbs. of lime, independently of that which is carried off in the bones of the animals subsequently fed upon it, which, however, would not be so large a quantity as by taking a second crop, a practice too frequently adopted, unless the land be in excellent condition.

Lime, therefore, in some form or other, becomes to a certain extent a remedy for this malady. *Superphosphate of lime* would undoubtedly be the best application; but *slaked* lime, or gypsum (sulphate of lime), would also be found to be of great benefit. But more of this subject when I treat of *gypsum*.

The first tendency of quick lime is to absorb moisture from the atmosphere. When thus slaked, a ton of quick lime becomes swollen to three times its bulk, and will then weigh 25 cwt. Whether this operation be performed quickly or slowly we have the same result; and the only possible advantage gained by slaking (before spreading it over the soil) is that the fine powder produced can be spread more evenly. The slaked lime very soon loses its burning properties; it attracts carbonic acid from the air, and reverts to the same condition (carbonate of lime) as before, only that it is now in a much finer state of division—a circumstance of the greatest importance.

As to the quantity of lime that may be applied to a soil, it is difficult to fix a limit, so much depends upon the other constituents of the soil. The only rule I can give you is this: the more clayey and undrained the soil, the larger may be the dressing of lime: on an arable soil there should be not less than 1 per cent. of lime present; but there may be much more than this in the soil, and that with great advantage. It would require 8 tons of burnt lime per acre to give the proportion of 1 per cent. to a soil six inches in depth. But let us suppose the land to contain a sufficiency of lime, how is it to be maintained? Certainly after a heavy liming no further addition is required to be made for six or eight years—for at the utmost the crop itself removes only from 1 to 2 bushels per acre in the course of the year. After this period the productiveness of the land gradually diminishes, the effect of the lime wears off, and by degrees the land returns to a state very similar to that in which it was before the lime was added to it. This arises from the fact that the lime is gradually removed from the land, partly by its weight carrying it down beyond the roots of the plants (when after a time it may be found forming a uniform stratum), partly by the water passing through the soil, and partly by the crops themselves.

Experiment leads to the conclusion that altogether about 8 bushels of lime are annually removed from an acre of ground. To keep the land therefore up to the mark, such a proportionate quantity ought to be applied to the soil at each rotation.

I cannot too strongly impress upon your minds the fact that the chemical effects which follow the use of lime are incalculably great.

It enables the soil to produce crops superior in quantity and quality; it increases the effect of the undecomposed manure; calls into action that which having been previously applied appears to lie dormant; and although manure should be plentifully laid upon the land, still this should be done *some time after it has been limed*, inasmuch as quick lime is apt to drive off all the ready-formed ammonia. If this be strictly attended to, the same degree of productiveness may be maintained, at a less cost of manure, than where no lime has been applied at all.

Then again, lime alters the natural produce of the land, by killing some kind of plants and encouraging the growth of others.

You are no doubt aware that lime destroys plants that are indigenous to marshes—that it kills heath, moss, bent, and sour grasses; and not only does lime bring up sweet herbage with much clover, but all fodder is made more nourishing when grown upon land to which lime has been abundantly applied.

There are many circumstances by which the effects of lime are modified. The quantity employed must vary according to the dryness of the soil, the amount of vegetable matter it contains, and the less or greater stiffness of the soil. The effects are the greatest when the lime has been well mixed with and kept near the surface. They have the least influence on poor arable lands which are worn out by repeated liming and cropping-ping. Lime, in fact, under these circumstances, does no good whatever.

Such soils are also wanting in numerous other kinds of food by which healthy plants are nourished, and they are only to be restored to a fertile condition by a judicious admixture of organic and inorganic matter. On land of this kind, and on all in which vegetable matter is wanting, lime may even do harm to the immediate crop. It is apt to singe or burn the corn sown upon it—an effect which is probably chemical, but which may in part be owing to its rendering more open and friable, soils which by long arable culture have become too open already.

As to the form in which lime should be applied, much must depend upon the nature and condition of the soil, the kind of cropping to which it is to be subjected, and the special purpose which the lime is intended to effect. To moss, sour grasses, &c., which it is desirable to exterminate, the lime should be applied in the live state, and in the same condition also to unwholesome subsoils. The more completely the quick lime is incorporated with the soil, in fact the more completely the slaking is done in direct contact with the soil, the better. But where lime is to be spread over grass without destroying the herbage, it is the better plan to slake the lime first in the open air. Thus it is obtained in the state of an exceedingly fine powder which can be easily spread, and while it is sufficiently mild to leave the tender grasses unharmed, it contains still a sufficient quantity of quicklime to produce those chemical changes in the soil on which its efficacy depends. To light and thin soils, and also to sands and gravels, which are poor in vegetable matter, quick lime should never be applied at all.

As there are many cases in which lime ought to be applied unmixed and in the caustic state, so there are others in which it is best and most beneficially laid upon the land in a mild state, and in the form of *compost*. Thus when lime is only required in small quantities it can be more easily spread when mixed with eight times its bulk of soil, and in the form of compost the same quantity of lime acts more immediately. While lying in a state of intermixture, those chemical changes which lime induces are to a certain extent taking place, and thus the sensible effect of the lime becomes apparent within a shorter time after it has been laid upon the land. This is still more visibly the case when decayed vegetable matter (such as the scourings of ditches, &c.,) are mixed with the lime. The experience of every practical farmer has long proved how very much more enriching such composts are, and how much more obvious in their effects upon the soil, than the simple application of lime alone. The older the compost, the more fertilising its action; and the form of compost is most especially adapted to the lightest and driest soils, and to such as are poorest in vegetable matter.

Hitherto, I have only spoken of the effect of a comparatively pure lime—on a future occasion I will endeavour to show how these are modified by the presence of other constituents besides lime contained in limestones.

I remain, your obedient servant, SAML. PARR.

P.S.—Since writing my last letter, on guano, I have received the following interesting statement respecting it from my friend Captain Fyfe, which I give you verbatim from one of his directories :—

"It is stated by Mr. B. R. Wilson, the well-informed English Consul of Peru, that though it is supposed that about 300 tons a-year have been carried for centuries from Chinca (pronounced Chinka), one of the islands in question, to the opposite coast, it is estimated that there is still upon this island the enormous quantity of 17,000,000 tons, and that the supply on the various islands on the group now alluded to may be safely estimated at above 40,000,000 tons. But exclusive of these, there are other islands more to the south, whence guano is shipped for Arequipa, and which are still far from being exhausted, and vast deposits have been found on the coast of the Mainland near Lamar or Cobiju; so that, making every allowance for exaggeration, the supply of guano cannot for all practical purposes be regarded otherwise than as inexhaustible.

THOMAS W. FYFE.

GENTLEMEN,—In my last letter I only considered the nature and properties of a pure kind of limestone, such as that of Crich.

I will now briefly turn your attention to various other substances frequently met with in limestones, the most important of which, for agricultural purposes, are magnesia, phosphoric acid, and sulphuric acid. Magnesian limestone acts in a way very similar to mountain limestone. It consists chiefly of a mixture of carbonate of magnesia with carbonate of lime, and, in the process of burning, it becomes caustic, losing all or nearly all its carbonic acid. The only restriction I would give you with regard to magnesian lime is, that it ought to be used more sparingly than lime which does not contain any magnesia, because it absorbs carbonic acid much more slowly, and consequently remains longer in a caustic state. It is more adapted for arable than for grass land; in fact, its occasional application to the former, in the mountain limestone districts (these containing no magnesia) is almost indispensable, because all cereals, wheat, barley, oats, &c., require a certain amount of magnesia for the perfect development of both their straw and corn. Magnesian lime is admirably suited for peaty soils, because, as I said before, it remains longer in a caustic state, and puts the vegetable matter they contain into a much better condition to support the growth of plants, supplying them, as it does, with two essential ingredients, magnesia and lime.

But what can I say about a limestone which in addition to lime and magnesia is capable of supplying to the land both phosphates and sulphates? Such a one is of course far preferable to any other—a limestone like the Cropwell, the lowest stratum of which, I believe, according to Dr. Bernay's analysis (the samples for which I obtained for his work on the limestones of this neighbourhood, yet unpublished) contains as much as 3 per cent. of phosphates, and there can be no question that such a one must be far superior to a limestone which contains no phosphoric acid at all.

The phosphates are obtained from the different fossils which are found embedded in the limestone, and therefore by using such a lime as this you furnish to the soil a certain amount of bones in addition to lime and magnesia, which cannot fail to be of great advantage.

Let us now see what is the action of lime upon the constituents of the soil. As a chemical constituent of the soil it affords both lime and carbonic acid to the plant; it neutralises the acids (such as humic acid) which are naturally formed in soils; it changes inert vegetable matter into active food, and aids greatly in the decomposition of minerals in the soil, such as the compounds of iron, manganese, alumina, potash, soda, ammonia, and silica. That lime exercises great influence upon organic matter is evident from the fact that the larger the quantity of organic matter in lime-compost, the more fertilising are its effects.

Organic matter is often found in the soil in such a state that its decomposition cannot be effected by the joint action of air and water without further help. A chemical agent is therefore required, and lime is found to be the cheapest and best for the purpose. Not only does it furnish a supply of carbonic acid by hastening the absorption of oxygen; not only does it engender nitric acid, and, under favourable circumstances, ammonia; but it sets free the small but most valuable inorganic ingredients in the soil, viz., the potash, soda, and silica. These are amongst its chief effects; and, for the same reason too, it is evident that *over liming* exhausts the soil—hence the old proverb "Lime enriches the fathers and impoverishes the sons." As the organic matter decays more rapidly under the influence of lime, so the mineral or inorganic substances which exist in the soil are also set free in a much larger proportion than if the land had not been limed at all, and are brought into a condition in which they can be more abundantly removed from the soil by the crops.

Whatever amount of action lime may exercise in liberating potash, soda, phosphoric, sulphuric, and silicic acids from the mineral fragments with which they are naturally associated, it will to the same extent make these substances more easily removeable from the soil. These various compounds then, organic and inorganic, being decomposed, and their constituents set free more abundantly, the roots of plants obtain them more readily and in a form more easily to be assimilated; thus the plants themselves grow more rapidly and to a larger size, perfecting all their parts more completely; in other words, larger crops are grown, and by means of those larger crops more matter of every kind is produced by the soil, and consequently a greater amount of matter is extracted from it.

But lime does not necessarily exhaust the soil. The addition of lime at certain intervals is actually necessary to the highest state of fertility. It is the part of the experienced farmer so to treat the land in other respects, that the addition of lime shall not prove exhaustive. The apparent exhaustion produced by the use of lime has always been observed in places where either successive doses of lime have been laid on the land *as the sole application*, or where too scanty supplies of other manure have been given to it. It is a natural consequence that where lime *only* is applied to the land, the more abundant crops produced must bring about a more rapid exhaustion.

It may be asked how is it possible that ammonia can be engendered by the addition of lime, when it is a notorious fact that lime dissipates ammonia and drives it out from soils? Both facts are true. Whenever either quick or slaked lime is mixed with a soil containing ammonia or its salts, the ammonia is volatilised (driven away); but when lime once becomes *mild*, that is, converted into carbonate, it ceases to expel ammonia from its combinations in the soil; it does not, however, in this state cease to act on the vegetable matter of soils, but assists greatly in the formation of ammonia and also of nitrates. The presence of mild lime assists especially in the formation of nitrates from the influence of the nitrogen contained in ammonia. It is well known that the production of nitre and saltpetre depends upon certain properties of the lime, whereby nitric acid is engendered from vegetable matter. In old compost heaps nitrate of lime is always to be found, and this salt is a most valuable manure. This explains a common practice among farmers, for many of you are in favour of applying lime soon after a dressing of farm-yard manure. Now, however objectionable this may be, *and nothing indeed can be more so* than to mix quick lime with well fermented manure; with manure, therefore, which contains the largest amount of ready-formed ammonia, the case is greatly altered when the lime is mild. It then actually aids in retaining or keeping in the ammonia by turning it first into nitric acid, which unites with a portion of the lime, forming nitrate of lime, and in this way retaining whatever is valuable in the ammonia, without in the least degree impairing its efficacy for promoting vegetation; for if nitrates are not valuable, how can we account for the marvellous effects of nitrate of soda as a top dressing for corn crops? I previously stated how much more valuable some limestones were than others, particularly those which contain phosphates.

The sulphate of lime or gypsum exists only in small quantity in any of the limestones, but on the contrary it is found to a very large extent in marls. The consideration of this subject, however, I must postpone for some future occasion.

I remain, your obedient servant, SAML. PARK

FATTENING TURKEYS WITH CHARCOAL.—Much has been published of late in our agricultural journals in relation to the alimentary properties of charcoal. It has been repeatedly asserted that domestic fowls may be fattened on it without any other food, and that too, in a shorter time than on the most nutritive grains. I have recently made an experiment, and must say that the result surprised me, as I had always been rather sceptical. Four turkeys were confined in a pen, and fed on meal, boiled potatoes, and oats. Four others of the same brood were also at the same time confined in another pen, and fed daily on the same articles, but with one pint of very finely pulverised charcoal mixed with their mixed meal and potatoes. They had also a plentiful supply of broken charcoal in their pen. The eight were killed on the same day, and there was a difference of one and a half pounds each in favour of the fowls which had been supplied with the charcoal, they being much the fattest and the meat greatly superior in tenderness and flavour.—Germantown Telegraph.

KENNINGTON AGRICULTURAL AND CHEMICAL COLLEGE.

LECTURES ON THE GENERAL PHENOMENA OF THE EARTH, HAVING REFERENCE TO THE PRODUCTION AND MAINTENANCE OF VEGETABLE LIFE.

BY CHARLES JOHNSON, ESQ., PROFESSOR OF BOTANY, GUY'S HOSPITAL.

LECTURE I.

The success of agriculture, as the basis of the prosperity of a country, is intimately connected with a variety of circumstances that are little thought of by the generality of those who practise the art, and still less by the majority of those dependent upon the products that it elicits. Now it is not intended to maintain that the knowledge of all such circumstances is essential to the practical farmer in the ordinary pursuit of his profession, but it may be readily understood how the habit of enquiry into the sources and causes of the objects and conditions by which he is surrounded, and by which the results of his labours are more or less immediately influenced, may lead to his ultimate benefit. The want of this habit it was that, until a very late period, constituted the grand obstacle to advance, not only in the department before us, but in almost every branch of scientific pursuit. The broad principle, that in nature every thing is dependent upon every other, was only acknowledged by a few of those master-spirits that in all ages and in all conditions of society have been at hand, to act as pioneers to improvement, and to prevent the downward tendency which their less active brethren of the mass would have cherished, simply from an absence of thought beyond the present time, and the content which that absence induced to remain satisfied with what their fathers had found to be all-sufficient in their days. That salutary doctrine of the disciplinarian school, which, however differently expressed as occasion varied, may be traced in all its purity and wholesomeness, in all its unanswerable power and beauty, in the moral to a well-known fable, "Young folk *think* old folk to be fools, but old folk *know* young folk to be fools," was paramount in the days of our grandfathers in its most literal sense, and those who ventured to diverge from the beaten path to think for themselves, ran the risk of being laughed at, or pitied as lunatics, as they would have done a few years before of being burned as infidels, sorcerers, or witches.

The period has arrived, when our countryman Roger Bacon is no longer regarded as an accomplice of the author of all evil, but as a philosopher in advance of his time, struggling against the prevailing prejudices by which science was then walled-in and jealously guarded, lest in her wanderings she might unshade the lamp of truth, and, by so doing, light up the darkness of an age when belief was fable, and its safeguard dreaming ignorance.

I commence with these remarks, because there is still lingering beneath the surface soil of modern improvement a portion of the ancient leaven, that now and then is apt to bubble up and disturb the growing harvest, while the soil in some parts is yet too thin and hungry to afford promise of quick return to the cultivation; and, as my lectures are likely to extend to subjects not immediately bearing upon the after-practice of the profession proposed for you by your friends, it is requisite to explain beforehand the object intended by this occupation of a portion of the time allotted to your general course of study. The more the mind is subjected to wholesome exercise, the greater become its capabilities, the medium through which it acts being strengthened by application; even as the arm of the smith wields with ease, from habit, the massive hammer which that of the looker-on, unused to his labour, could with difficulty raise from the ground. The limb, it is true, may be overworked, the brain may be overtasked, and both may fail, but the general principle remains uninjured by this admission; and, although in this establishment you are required to attend to many subjects not included in the curricula of schools in general, you enjoy more real leisure and relaxation from the routine of study than is often admitted. You are anything but overtasked.

The absence of general information, that is, of the knowledge of things and circumstances not immediately associating with their principal subject of pursuit, has often been a failing in the character of the leading men of their time in the different branches of science, and one that, while restraining their progress, has occasionally led them into errors which their writings have perpetuated. It is in conveying to you general information concerning the varied phenomena of nature that my office here consists. Not that it is to be imagined that the whole circle of natural science can be embraced, with all its details, even by the most expansive of human minds, but simply that an acquaintance with leading facts and principles in its different departments may serve to render your after-studies in either more easy of pursuit, and at the same time prevent those errors and misconceptions that result from ignorance on such points; above all, to induce the habit of observation and comparison, the leading sources of man's progressive improvement.

Inhabiting the surface of a planet presenting so great a diversity as does that of our earth, and deriving from it all that is essential to our existence, we are, owing to a familiarity that gradually increases from our birth, led to regard the one and to employ the other without a due consideration of the causes by which they were produced and by which their continuity is maintained. We admit the existence of a Creating Power, and we are grateful, perhaps, for the conditions in which we are placed; but it requires considerable exercise of our capabilities of observation to awaken the mind to the contemplation of that vast machinery by the agency of which those conditions have been produced. We look around us, and we see the tree and the herb springing from the ground, the animal fed, and our own wants supplied; but these are, all of them, circumstances so intimately connected with our own existence, that, although their absence might occasion us to question the cause of it, their presence leads to no such enquiry. Indeed, had it not been forced upon us, had it not been found that such circumstances vary in their results on different parts of the earth's surface—that the trees and herbs of one country are sought for in vain in others; that the natural food of the animal, even of mankind, is dependent on this diversified production—the philosopher might never even have dreamed of many of those enquiries that are now so rapidly extending over the whole economy of nature, and producing a series of results, the continuation of which is probably destined to introduce a vast change in the future of human society. The population of the earth, hourly increasing, is being distributed under the new impulses that have been given to human action by the increase of knowledge, to which those enquiries have led. Lands that a century or two past were unknown to the European, or which from their distance and position, were regarded as beyond the pale of his speculations—then solitary or scantily inhabited by an inferior race—are now overspread by his descendants, and have become scenes of civilisation, and of the untiring efforts of industry and commercial energy.

The progress of change is a marked feature, not in the history of man alone, but of the world that is his inheritance—nay, even of the universe, so far, at least, as our confined acquaintance with a surrounding speck amidst interminable space extends. The laws that regulate the general movements of those countless systems of habitable globes represented by the thousand stars of night, and the disturbances to which they are liable, are beyond the limits of human penetration—they are items in the over-ruling Will that directs them, the existence of which is scarcely yet permitted to be known to us, much less to become the subject of theory or discussion. Even the extent of the solar system, and the exact conditions of the planetary bodies that belong to it, are problems yet unsolved; and when leaving those distant and uncertain realms, over which thought vainly seeks a resting place, and imagination languishes, we descend to our own world, how little real knowledge have we yet acquired of its history and government! Here, however, we can dwell more at large, we feel at home and can look around us; nay, doubtful of the nature of our dwelling, that is not always as steady as we could wish, we have taken up the pavement here and there, and examined that which lies beneath—a very little way it is true, but sufficient to show that a period of vast duration was occupied in the preparation of this earth as an abode for man. Countless series of organized and living beings, endowed with attributes fitted to the states of existence they were destined to fulfil, have left their remains imbedded in its rocks as records of its past condition; while the rocks themselves bear evidence, in their structure and composition, of the natural causes under which they were formed or deposited. The researches of the geologist have established a series of facts, but the conclusions drawn from their comparison are often uncertain, and, in connexion with the possible condition of the interior of our globe, are too partial to elicit even that degree of knowledge upon which a plausible theory might be established.

The study of the surface of the earth is at first sight one of easy pursuit and positive elucidation. Geology, although yet itself in the aggregate rather speculative than certain, has done much for the advancement of its sister science. Geography is now *physical*, no longer the mere matter-of-fact statement of existing circumstances, but the medium of enquiry into the past and future of the various phenomena by the agency of which they were produced, and by which they are liable to be overthrown. It is in this form that the value of the study is rendered of an importance that only two or three generations past was unknown; it is essentially a novel branch of science, capable of being made subservient to so many pursuits, that, independent of the reasons to be adduced in its favour, as a part of general education necessary to the character of a well-informed person, it must eventually occupy a high rank among the most useful branches of knowledge. At present, many of the phenomena that belong to, or are intimately connected with it, are of too recent observance to have their action reduced to rule or standard, by which their influence can be calculated upon with certainty. This is especially the case with those connected with meteorological causes and effects, upon which depend some of the more remarkable differences in the climate of countries occupying the same parallels of latitude.

This science of physical geography has been the subject of our weekly course of lectures during the past year, and you have had a detail of the principal facts connected with its study on a broad scale; but that detail has been only a glance at phenomena as they exist, apart from results. We must therefore recapitulate, because our present subject is excursive over a wide expanse of the region of human thought and enquiry, and we must bear in mind certain of the generalities belonging to it, that we may be prepared to expect casualties, and understand the sources whence they arise.

That our world is a globe, moving in space around the sun within a determinate period which we term a year, and that at the same time it revolves upon its own axis, an imaginary line passing through its centre, thus turning successively every part of its surface towards that luminary, and producing the alternation of day and night, are facts belonging to the simplest elements of geographical and astronomical enquiry. But what is this globe? Of what does it consist? Let us first consider its bulk: in even numbers it has a circumference of 24,000 miles, giving on the same plan a diameter of 8,000 miles, or a distance of 4,000 miles between the surface and the centre. The irregularity of the surface, great as it appears to our eye, as we move over it, is trifling indeed compared with these figures. The loftiest mountain has an elevation of less than 5 miles: the greatest estimated depth of the ocean is 9 miles. Of these 4,000 miles we have never yet penetrated one mile below the mean level; but the surface has been broken and the mountains uplifted from a greater depth; and the geologist claims, from observation of what has thus been elevated from beneath, acquaintance with a probable thickness of 10 miles: of all below this, or 3,990 miles to the centre, we are ignorant. The lowest material of this mere crust of 10 miles in thickness is a crystallised rocky substance, granite, the texture of which, and certain circumstances connected with its disposition, seem to indicate that it was originally fluid under the action of intense heat, and that it has more or less gradually cooled into its present form; a conclusion further warranted by the fact that the rocks which rest immediately upon this granite, and which are of various composition, afford positive evidence of alteration in texture by the action of that heat to which they must have been subjected by contact with the melted and slowly cooling mass beneath. When to these data are added the almost uniform results of experiments with the thermometer at different depths in mines, in various parts of the world, showing a gradual increase of temperature the lower we descend, the notion entertained by a majority of those who have studied the early history of our planet, from the evidences afforded by its present condition, though incapable of positive demonstration, are not incompatible with probability. The earth has cooled from a prior state of igneous fusion, and we are dwelling a few miles above an incandescent mass of mineral substance, that still from time to time manifests its presence in the action of the earthquake and volcano, and may be destined at some more or less distant epoch to again break up that surface which everywhere betrays the disturbing power to which it has been subjected in past periods, when the mountains were forced up by explosion from beneath, and the continents and islands successively raised above the level of the waters. Imagination, however, is a power of the human mind too liable to run wild and exaggerate in the contemplation of a subject like this, and especially is it dangerous to scientific pursuit to allow it the freedom of overrule; and we will therefore leave the picture of a fiery globe circling in space, surrounded by an atmosphere of mingled gas and vapour, together with the consequences attendant on the gradual cooling of the fluid mass, and subsequent condensation, to be completed at leisure.

This world of ours, so far as we can observe it, consists of elementary matter in the three forms of solid, fluid, and gaseous —the two former evident to sight and touch, the latter invisible but tangible; earth, water, and air, alike matter, and owing their peculiarities of condition to the influence of a principle that we are unable to define, and which is only traceable by the effects it produces upon this *matter* or substance: name it has not—individuality it has not: it is the realisation of the Protean fable of antiquity, so many forms does it assume, so many attributes does it possess. Manifesting itself in all the inexplicable phenomena of nature, in all the modifications of substance, it is itself immaterial; it is the opposing force to the inertia of matter, the active element of organisation; it is the ideal symbol of Omnipresence, the probable link between body and soul, between the created and the Creator. This wonderful, this incomprehensible agent of Almighty Wisdom is the grand secret of the universe, the impassable limit to human advance. It is, according to its action on our organs of perception, heat, light, electricity, magnetism, chemical action; like the genii of Arabian romance, the stories of the lamp and the ring, we can compel its service to our will, but itself—it eludes our grasp. It warms and lights, it stimulates our failing frame, it fulfils our messages without regard to time or distance; but we perceive it only as it flies, and the agent that warms, lights, stimulates, or informs, is gone in the very act by which it becomes manifest.

Such are, in *brief*, the constituents of our earth; such the mysterious agency to which they are subject, and which, operating for the most part unseen, is unappreciated by the mass of society. But the student of natural science must, in estimating the probable success or failure of his projects and experiments, bear in mind that all the phenomena he seeks to elicit, all the results that he is desirous of attaining, are dependent upon this power, only capable of recognition in the moment of action, only yielding to man's government under the strictest attention to experience of its operation. The knowledge that such a principle is ever around us, nay, within ourselves, should teach us the necessity of constant observation and comparison of cause and effect. Human improvement has only advanced in proportion to the prevalence of the habit of watching the operations of nature, and imitating them to the attainment of similar consequences. But we must not anticipate: our subject is the earth and its composition. The existing conditions of the proximate elements of its substance, depending upon the subtle agent in question, are liable to change in accordance with certain relative influences that at present we either do not understand or with which we are but very imperfectly acquainted. Of this much we are aware, viz., that the change from the solid to the fluid or gaseous *form* is, in most instances, apparently the immediate result of an absorption of heat; while the condensation of the two latter to the solid is accompanied by the separation of heat. But though change of temperature is always associated with alterations of condition in matter, the modification of the altered substance may be very different under different circumstances. Thus water may become solid without freezing, and the various gases may enter at once into the composition of the solid, without the intermediate fluid transition. It is under the laws regulating such transmutation that many of the phenomena of so-called chemical action, and the appropriation and assimilation of the food into organic structure, whether vegetable or animal, take place.

The simple substances or elements composing the solid, aqueous, and aëriform materials of the globe are above sixty in number, and, with the exception of twelve or fourteen, metallic; but several of the latter exist in nature under various combinations, especially with oxygen, constituting earths, alkalies, and salts. Though the known elements are so numerous, those of which the masses are chiefly composed are comparatively few, namely, among non-metallic bodies, *oxygen, hydrogen, nitrogen, carbon silicon, chlorine*, and *sulphur*—among metallic, the earths *lime, alumina*, and *magnesia*, and the alkalies *potash* and *soda*. Water is a compound of oxygen and hydrogen; the atmosphere, of oxygen and nitrogen; but neither air nor water is, in its purest natural state, free from admixture of other elements, in varied, but always minor proportion, and often so minute as to be detected only by the most careful chemical investigation.

An examination of the surface of the earth, as depicted on a terrestrial globe or on a map of the world, presents us with two remarkable features—in the first place, the large proportion of that surface that is occupied by the ocean; and secondly, the very irregular disposition of the land and water. Nearly three-fourths of the whole superficial extent is covered by the ocean, leaving only about one quarter to be occupied by the continents and islands; and these, instead of being so situated as to divide the waters equally, are chiefly in the northern hemisphere. "No disposition of land," observes a celebrated geologist, "can well be imagined more irregular, or, as it were, capricious, than that which now prevails; for, at present, the globe may be divided into two equal parts, in such a manner, that one hemisphere shall be almost entirely covered with water, while the other shall contain less water than land; and this is shown by projecting a map on the horizon of London, that is to say, by supposing the eye of the observer to be placed above that city, and to see thence one-half of the globe. For it so happens that from that point, and no other, we should behold the greatest quantity of land; and if we were then transferred to the opposite or antipodal point, New Zealand, we should see the greatest possible quantity of water." If we regard the forms of the two great continents and of the larger islands, their outline is as varied as is their relative position. The western continent, America, divided into two almost separate portions about the middle, stretches from north to south; while the eastern, containing Europe and Asia, has its greatest continuous length from west to east, with Africa attached to it on the south by the narrow isthmus of Suez. Let us observe next how irregular are the lines of their sea-coasts; how apparently broken and indented on all sides; how the islands seem to have been shattered from the continents, and to record, as so many disjointed remnants of former lands, the occurrence of vast and widely-spreading convulsions, that must have shaken our disturbed planet even to its centre, that have left it with the aspect of a ruin, and as though its present condition were the result of chance. Let us even carry our observations a little farther, and notice the characters and appearances of the interior of these lands—how in some parts they are elevated into lines of mountains; while in others they extend, to the length of hundreds, nay, even thousands of miles, low and almost level; how the summits of the mountains are often shivered and broken, and their sides irregularly split; and how the lowlands are in some districts liable to be deluged from time to time, while in others they remain for thousands of years dry and desolate. These, and many other circumstances, seem strangely opposed to that condition of things which might seem to the would-be world-improver more advantageous to mankind. If, however, we study our subject more closely, and compare the effects arising from these irregularities, and, in many instances, apparent evils, with those which would be the consequences of their absence, we shall readily acknowledge that so far from being really such, they are sources of benefit under those natural conditions with which not only man's moral improvement and mental advance, but even his very existence upon the earth are closely interwoven.

That the irregularities in question have been really the results of numberless catastrophes to which the world has been subjected in past times, no one acquainted with the general facts of geological science would hesitate for a moment to affirm; but that they have constituted no unimportant portion of that series of modifications by which it was prepared to become the dwelling of an intelligent and improving race, is no less certain. Partial views of nature are very apt to mislead, and to render us disposed to question the utility of dispensations not immediately contributing to our own advantage; and although it often occurs that circumstances prove adverse to pursuits and operations upon which we have based our expectations, and disappointment succeeds hope, it is well to enquire whether that check to our progress has not been rather induced by our own mistaken policy than by any broad defect in the general system of things around us. The farmer, for instance, who complains of the failure of a crop, does not bear in mind how necessary the peculiar state of the weather, which has affected him prejudicially, may have been to the maintenance of a due balance of the natural laws regulating the climate of a continent, or of the world at large; he regards only the immediate and positive evil to his fortunes, and not his own deficiency of observation as to the cause: that weather—that peculiarity of season—had doubtless its prospective indications, which he was either unable to read, or too idle to seek to decipher, and therefore let ancient custom, often right no doubt but sometimes wrong, maintain its rule and risk. Verily, if each had his will, every little island would be a wonderful scene of conflicting elements and parti-coloured skies. The artist would have his thunder-cloud and his rainbow; the holiday-seeker his bright blue canopy; the petty proprietor of one field fair weather for sowing barley; and his neighbour a little rain to his turnips. As it is ordained, each has his turn, and, what is far more important than all, each has his stimulus to exertion in these apparent defects of the universal government, that, were matters differently arranged, would be wanting to prevent the listlessness and apathy, to which human nature is too prone where its wants are provided for without thought or care of its own.

SEWAGE OF TOWNS AS MANURE.

On several occasions subsequent to the commencement of the drainage of Croydon, in 1849, I communicated the results of many experiments, made by me, to ascertain the effects of certain substances employed as deodorizers of the fæcal matters conveyed through stoneware pipes into one common receptacle, termed a "filter," situated on a plot so low as to furnish a rapid descent from every part of the town. Now, after perusing the valuable article upon drainage in the *Mark-lane Express* of the 3rd inst., I offer the following suggestive remarks. It is admitted that the matters obtained from the drains are really a special manure; but the question here presents itself, How and in what condition ought it to be used as a fertilizer with the greatest facility, and at the least possible expense? We learn, from the best authorities, that "the Craigentinny meadows, near Edinburgh, *irrigated with the entire sewage* as it flows, are begun to be cut as green food for cows in April, and so continued at intervals until the end of November. As a natural consequence, the worth of the land has risen in rent from 30s. and £6 per acre to £20 a year." There is now close to Croydon a residence on rising ground so high as to allow a ready descent of all the house and laundry drainage, unaltered; by which a large plot of coarse grass-turf has been made to yield for several years three cuttings of rich, tall grass as fodder, and at the same time to fertilize a large kitchen-garden. With facts so conclusive on the one hand, and with the very questionable utility of the *solids* obtainable by filtration on the other, we conclude that sewage, in order to become a fertilizer, *must* be employed simply, and in its *totality*, without any attempt to separate and manufacture its solid constituents.

Here, however, serious difficulties present themselves; and these arise from the immense volume of water with which the manuring elements are held in suspension. By one analysis, in London, it was seen that only 85 grains and a fraction of saline, and the more solid matters, were obtained from a gallon of the King's Scholars' Pond sewage; and, consequently, that to obtain a single ton of manure from it, 560 tons of the sewage would be required, or 5,600 tons in cases where it was the object to manure to the extent of 10 tons per acre. At Croydon, or other such towns, it perhaps might be possible and expedient to convey by machinery—tubes and steam-power—the whole volume of its fæcal products, in order to irrigate its poor, extensive downs and grassy commons; but what man, or what sanitary board, could venture an attempt so to dispose of the millions of tons of liquid matters which flow daily into the Thames from the drains of the metropolis? As sewage can only be used for irrigation, and not by any means for arable tillage, it is clear that decomposable, organic manure—of which fold and farm-yard manure constitute the best type—must constantly be resorted to, in order to fertilize land for the bulbous and cereal crops. The agency of electricity is vital to plants, and that wonderful element is always developed by what is termed *chemical action*. The slow decomposition of manures in the soil produces an electric stream; hence it follows that the raw sap is so propelled upwards, conveying nutriment to the green parts of the growing plants; at the same time the stream becomes the connecting medium between the ground and the *descending* electricity of the atmosphere.

Croydon, Dec. 7. JOHN TOWERS.

WINCHESTER FARMERS' CLUB.

The monthly meeting was held at the Black Swan Inn, Winchester, on Saturday the 25th of November last, Mr. Robert Pile, President of the Club, in the chair.

The subject for the evening's discussion was "The rotation of cropping on arable sheep-stock farms in Hampshire, in connection with equitable payment of the out-going tenant for hay and straw and husbandry operations."

The CHAIRMAN said, Gentlemen,—I have selected this subject for discussion, with the view of ascertaining your opinions upon it, as practical agriculturists, and not with any intention of endeavouring to enforce any particular rotation, and which I observed on a former occasion, in my humble opinion the occupiers of the soil should be left free to exercise their skill and judgment in its cultivation; for if there is an ample live stock kept on the land, there is not the least danger of an impoverishing system being practised; still, an equitable system of quitting requires to be ascertained, both for the out-going and the in-coming tenant, and which, I trust, you will be enabled this evening to define and decide upon. First, with regard to cropping, I will take a farm of 1200 acres of arable land, supposed to be capable of maintaining a sheep per acre:—

200	acres, one-sixth to be sown with sainfoin in four different years, 50 acres each—1, 2, 3, and 4 years' growth.
250	acres wheat.
250	acres—half winter vetches and rye, &c., and half swedes—and the half after vetches, &c., fed off, to be sown with turnips.
250	acres barley and oats, the half-after swedes to be sown with red clover, and the other half hop and ray.
250	acres—half red clover mown for hay, and the other half hop and ray, fed off at spring, and sown with rape and forward turnips, before wheat, and the clover ley ploughed and pressed for wheat.
1200	

According to this rotation, there would be 500 acres corn, and 700 acres for the support of the live stock, and not two cereal crops grown in succession; and the land with red clover once in eight years, and all the land with sainfoin in turn, about once in 24 years, supposing each sowing should last four years. If the occupier of such a farm has usually during his term adopted this rotation, and at the time of quitting was expected to leave the land for the system to be continued by his successor, then he should be paid according to valuation for the four different ages of sainfoin roots, and market price for the last year's hay, and one-third less than market price for the last year's Lent corn straw, haulm, and hulls, and full value for all tillages and husbandry operations, and temporary or other improvements, and unexhausted purchased manure, by which the in-coming tenant would derive a benefit from, in accordance with the Tenant Right Rules, drawn and approved by this club, May 8, 1850. In the last year of the tenant's occupancy, according to the rotation before described, he should leave 125 acres, after wheat, fallowed by the previous Christmas, for which fallowing he should be paid by the in-coming tenant, who is to enter on it to prepare for swedes the succeeding Lady Day, and provided with stables, and straw for litter for nine horses; and who is to enter upon the other 125 acres, sown with vetches and rye, &c., after wheat, as soon as the crops are fed off, to prepare and sow the land with turnips. The out-going tenant should be allowed to haul and spread the last year's farm-yard dung upon the one year's hop and ray ley, and sow it with rape and turnips, to be fed off preparatory to wheat, and entered upon by the in-coming tenant as soon as fed off. For hauling and spreading such dung he should be paid for; and should be allowed the feed upon the whole of the farm (except that part sown with swedes and turnips), until the 6th day of October; and should fold his usual number of sheep upon some part of the farm, as he usually had done during his occupancy, till a week prior to the 6th day of October, and to give up possession of the whole of the land on the 11th of October; and half the farm house, and cottages, and stables, and yards, and retain possession of the other half, and the whole of the barns, until the succeeding Old Midsummer, July 6, when the whole is to be given up to the landlord or his in-coming tenant, in good tenantable repair. I consider that the out-going tenant should cultivate and leave the land in the same state and condition as he would if he was going to continue its occupation, and for which, in justice to himself and family, he is fairly entitled to be remunerated by the in-coming tenant, and both parties would derive a much greater benefit than under the exhausting system usually adopted in this county. And supposing such a farm of 1200 acres is worth, to rent, the annual sum of

£1080, with wheat at 60s. per qr., barley 32s. per qr., and meat at 6d. per lb., would it not be equitable towards landlord and tenant to apportion the rent in accordance with the average price of the kingdom for wheat and barley, and the average price of meat in Smithfield market—say one-third wheat, one-third barley, and one-third meat? The rent would be then regulated by the price of 960 bushels of wheat, 1800 bushels of barley, and 15,400 lb. of meat. Of course the equity of this system depends upon obtaining correct averages, and so it is with regulating the payments of rent charges in lieu of tithes, in which most agriculturists are deeply concerned, and they should not rest satisfied until correct returns are obtained. Although this suggestion does not concern the present subject, I merely take this opportunity of mentioning it, in case any parties should wish to adopt the system; and will also add that I consider it most important for every occupier of land to be provided with good comfortable, healthy cottages, containing three bed-rooms each, and a garden of 20 poles attached to each, for the whole number of labourers required on the farm. The next rotation I will call your attention to is the six-field system. 200 acres sainfoin; 200 acres wheat; 200 acres, half barley and half swedes, after wheat; 200 acres, half barley, after swedes, sown with red clover, and the other half vetches, rye, &c., after barley; 200 acres, half red clover, to be mown, and half backward turnips, after vetches, rye, &c., fed off; 200 acres, half two years' ley, after red clover, and half rape and forward turnips, after backward turnips. According to this rotation, there would be 400 acres corn, and 800 acres for the support of the live stock, and the land sown with red clover once in ten years. The next rotation is the four-field system. Wheat, turnips and swedes, barley, clover and grass. This excludes sanfoin, which is a most essential crop on a sheep stock farm, and particularly in a dry season. By this rotation there would be 600 acres of corn, and 600 acres for the support of the live stock, and the land would be sown with red clover once in eight years, and hop and ray once in eight years. Having stated these three different rotations of cropping, I will now leave it in your hands to decide, and to name others which you consider would be more advantages, and will now read the following resolution for your approval, or amendment, or rejection:—Resolved,—That, in the opinion of this club, if a sufficient number of sheep are kept, the occupier of the land should not be restricted in its cultivation, and at the time of quitting the land should be left in a good state, and in the regular rotation it had usually been cultivated by the outgoing tenant, and for which he should be paid by the landlord or in-coming tenant, according to the Tenant Right Rules approved by this club, May 8, 1850.

The CHAIRMAN noticed the liberality of the Earl of Pembroke towards his tenants, stating that his lordship allowed them half the costs of artificial manures.

Mr. J. T. TWYNAM observed that in respect of artificial manures, a question would arise whether the compensation to the tenant should be confined to artificial manure, or whether dung made by animals on the farm was to be considered as artificial manure. He knew a case where a person was in the habit of drilling in his pig manure, and the valuer objected to allow compensation for this, observing that it was not the custom in Hampshire to pay for things of that description, though he did not object to pay for other manures; but he thought that an in-coming tenant had clearly as much right to pay for this as he had for artificial manure, and was desirous that an opinion should be now given whether manure made in that way should be paid for the same as artificial manure. In his opinion it ought to be, because it was more valuable. As regarded tenants, an out-going tenant was allowed to fallow the ground, and to be paid for it, as the land was in a much better state to come on than when entered on in March and May. In no case had he seen the recommendation of the club adopted with regard to the rules relating to tenant right. It was usual to allow for bones and guano, and he thought, on every principle of equity, the allowance for other manure, to the extent recommended by the club, ought to be adopted.

Mr. W. PAIN said he was sorry to see the members so backward in expressing their opinions on this important subject; and perhaps it might be rather out of place in him to rise on the present occasion to do so, since he had given up business as a farmer [No, no!]. It might be in their recollection that he once brought the subject before the club, and an account of the proceedings would be found in the first annual report. At that meeting he had given an opinion, as he should do now, that it is impossible to lay down any system of cultivation to which a man can thoroughly confine himself; therefore, although they might now discuss which was the best system, it appeared to be futile, because they could not come to certain conclusions. He had been in the habit of adopting the four-course system, but found he could not always carry out his plans, on account of the weather not being suitable, and was in consequence obliged to sow with turnips, having afterwards two crops of corn. The principal thing was to keep a good stock on the farm, for where there was a good stock of sheep, it mattered not that one particular course of cultivation should be strictly adhered to. Under such circumstances he did not think a farm could sustain any injury, and he had once told his landlord so, who replied that he was of the same opinion, and had no objection, where a good stock of sheep was kept, to any particular course of sowing. No man could set up a particular system of cropping. All three rotation crops might be very good in some cases, and perhaps one of them might be adopted on almost every description of soil. No man could hurt a farm under such a system. With regard to the payment of an out-going tenant, he would remark that the subject had been so often discussed at the club, and the rules so widely circulated, that it would be unnecessary for him to dwell upon it further than to say that in this respect he had never altered his opinion. He earnestly wished that the members of the club would hold together as they had done, and not now relax their exertion because wheat was £20 a load, for in his opinion that was the time to strengthen their union, and to induce them to cling together the same as other classes of the community had done.

Mr. **Walton** said he rose with great pleasure to compliment the chairman on the able manner in which he had brought the subject forward. For his own part, he must say that he thought that either of the three systems recommended might be adopted with success on almost any farm. He, unfortunately, might say he had stood alone in making use of observations respecting the mainspring of agriculture—he meant the duty of the landlords, not in any intentional disrespect, but for the purpose of recommending them to encourage their tenants, and aid them in making improvements; for, as Mr. Drummond had said, "property has its duties as well as its privileges," and he could not see that any harm could arise from the adoption of his recommendation; for he was of opinion that under the present improved state of agriculture, no restriction whatever should be imposed on a tenant further than that he should be bound not to leave the land in a worse state than he found it on entering, because a man had no right to be shackled or prevented from making the most of the land he could. He maintained that everything grown and produced on a farm belonged to the man who produced it. There was one thing in which he was opposed to Mr. Pile's proposition, and that was the out-going tenants were not to have the sale price for their fodder. Everything which the land produced belonged to the tenant, not that he considered the tenant had any right to make waste; and though such a covenant might be put in his lease—many things contrary to good husbandry were put in—he would not have a single thing named as to cultivation. It was to the interest of the tenant to keep the greatest quantity of stock, and to cultivate the land in the best manner to insure good crops. Turnips were the mother of corn. He was pleased to hear what had fallen from the chairman respecting the encouragement given by the Earl of Pembroke to his tenants, by which he was promoting what God intended, that they should be enabled to produce the greatest quantity of food for the sustenance of man. But, generally speaking, he would say that this country, though it might be made capable, did not produce sufficient for the consumption of the people. He had seen lands in his own and other neighbourhoods miserably cultivated; and generally, wherever that was the case, it was to be attributed to the want of proper farm buildings and encouragement on the part of the landlords, who by withholding good covenants and tenant right were the cause of this state of things. On the contrary, if a landlord fulfilled his contract, as an equitable and liberal man, he had a right to insist that his tenant should do his duty, for he would not countenance those who by so injuring the land abridged its produce, and thereby inflicted an injury on the country at large; but when he looked from Farleigh Hill up to Petersfield, and saw land in a zig-zag direction to the extent of thousands of acres in a most miserable state, which would not produce on an average more than four sacks of wheat per acre, and other crops in proportion, he thought the blame did not rest wholly on the occupiers. Was it not therefore lamentable to think that they did not progress? But he was afraid that the cause was a six months' tenancy, under which no man could cultivate the land with success, or excess of game and rabbits. No prudent man would risk his capital without having security that he would be compensated for unexhausted manure left in the land when quitting his farm. It was impossible, under such circumstances, to expect that the condition of the land would be improved. He had been chastised by his brother farmers, and by the landlords, when he had said that it rested with them whether the people of this country should be fed with the produce of its own soil, or by the produce of foreign lands. Referring to two letters recently published by Messrs. Caird and M'Culloch, Mr. Walton pointed out the difference of opinion between these gentlemen as to the quantity of corn grown in this country. As to Mr. Caird's opinion upon agriculture, it was so erroneous and contrary to good husbandry that farmers thought but little of it, and observed that if the waste lands were brought into cultivation (security being given by the landlords to the tenants), he had no hesitation in saying that they might be made so productive that this country would be enabled to grow sufficient for all. Mr. Twynam had stated that he had been thwarted in respect to pig manure, and he agreed that the greatest facility should be given by the construction of proper buildings to make manure. With regard to his own occupation, he had only got two years' notice, and under his agreement he was to be paid for all pig dung in the same manner as artificial manures; but if he put it on the land, he was to receive no remuneration whatever for carting, although the land would be so much the better. Covenants generally in leases were, in his opinion, anything but beneficial either to landlord or tenant. He had as good a tenant right as any man in England had, but he would rather have a lease for twenty-one years without that tenant-right; but to have the land properly cultivated both should be connected, though in two years, under a system of bad cultivation, a tenant might be able to exhaust the manure he had expended on his farm; but where a man' had security he would not adopt such a course; it would take eight or ten years to exhaust a good cultivated farm. There must be some grand movement—some alteration in the landlord and tenants' principle. It would not be at all derogatory to the character of a gentleman to see that his farms were properly cultivated. It rested alone with the landlords of England, who did not give honourable security—the security of tenant-right by payment for unexhausted improvements. It rested with them alone whether the nation shall be fed by the produce of our own soil, or by that of foreign lands.

Mr. W. H. **Earle** said as they all appeared to approve of the observations made by the chairman, and also to concur in the remarks of Mr. Walton, as connected with the subject brought forward for the evening's discussion, there appeared to be nothing left on which to found an argument, except the system under which land is generally held; but as that question had been already brought before them, it would not be necessary for him now to comment upon it. He recommended that they should rally round each other, and at their next meeting he anticipated that they would meet under better circumstances than they had done for many years past, so far as agricultural prospects were concerned; and, as regards the club, he thought it was in as good a position, considering the difficulties it had to encounter, as could be expected therefore they ought not to despair.

The **Secretary** read the resolution with which the chairman closed his address, and no amendment having been proposed,

Mr. **Richards** moved that the resolution which had just been read be adopted. Mr. T. Earle seconded the motion, which was unanimously agreed to.

On the motion of Mr. Walton, seconded by Mr. Cordery, the thanks of the meeting were unanimously voted to the chairman, not only for his able conduct generally in the chair, but for the ability which he had displayed that evening in bringing the important subject forward.

The **Chairman** said he felt extremely obliged by the compliment which had been paid to him, and was much pleased that the subject which he had brought forward had met their approbation. He had long thought that there should be some different system suggested by practical men under which out-going tenants should be paid for their improvements. He was of opinion that they ought to be allowed one-third. He thought that landlords ought not to bind their tenants by unnecessary covenants, neither did he think it was their desire generally to do so; for he knew some who would be grateful if farmers would give them information by which they might be able to introduce useful covenants, and none were necessary, provided the land was kept in a good state; therefore tenants should intimate to their landlords what equivalent they considered an out-going tenant should receive. With regard to the allusion made to landlords, it would be recollected that he had on a former occasion stated that these gentlemen held their estates under various tenures—some were entailed, others copyhold, lifehold, or leasehold; they must, therefore, be just to themselves before they could act liberally towards their tenants. In order to enable them to do so, he thought that the costs of all improvements on entailed estates should be charged on those estates; copyhold and lifehold estates ought to be enfranchised under the supervision of such men as the Tithe Commissioners, and renewals ought to be commuted for by a rent-charge in the same way as tithes are commuted, then the landlords would be placed in a safe position, and until that is done they must not blame the proprietors; for, taken as a body, he believed that there was not a more honourable class of men existing than the landlords of England; but they were not men of business. It would, therefore, be conferring a great obligation if agriculturists would impart to them such information as would be mutually beneficial.—Adjourned.

THE VINE DISEASE.—A commission established at Bordeaux to make investigations respecting the malady in vines, and the means proposed for its cure, has published a series of resolutions, in which it declares that the various remedies that have been recommended have produced no satisfactory results. It declares also that the malady was less intense last year than previously, that the vines at present are in an infinitely better condition than at the same period in 1852 and 1853, that the malady appears to have entered on its period of decline, and that it would be a great error to pull up the vines, which form the principal wealth of the Gironde.

BRIAREUS WITH A HUNDRED HEADS HAS BUT ONE NECK.

While our brave soldiers are fighting for liberty abroad, let us not overlook an enemy at home—an enemy which, if not opposed and routed, will complete, as it has begun, the destruction of this country. Let us sound the alarm, and marshal our forces against the many-headed foe of National prosperity, and Human progress. This Briareus is *Vice:* the single neck that supports its hundred heads, is *Ignorance*. To destroy its vitality we must sever this neck. Be it ours to undertake the task.

It may be hinted by some incredulous or indifferent ones, that I am making too much of a scape-goat of ignorance, and too much of a patent universal medicine of education: but I think not.

Throughout England there is a vigorous crusade undertaken against the sensual pleasures which have time out of memory occupied the leisure of the lower classes. Beer-shops and gin-palaces, &c., may be annihilated; but if the working-man is deprived, as a substitute, of those recreations which consist of the intellectual and moral enjoyments that education and good training supply, he naturally falls again, in spite of law and reason, into the excitement of sensual indulgence, because excitement all human beings must have. Depend upon it, if we want to make the work-people of this country more temperate, and secure moral, sanitary, and social improvements amongst them, education must be at the bottom of it all.

Notice has already been taken of the increase of leisure which it is supposed will flow from the substitution of machinery for the thews and sinews of man, as well as of our individual duty to fit ourselves and others for the proper employment of the approaching boon. A cultivated mind will alone prepare our country for the continuance and enjoyment of such an age, should it arrive. A well-educated mind is its own entertainment. Its pleasures are peculiar. Inherent, they cannot be affected by the accidents of life. Spiritual in nature, they create a disrelish for mere animal gratification, and "keep the body under." They cannot pall upon the taste; they do not incur the reproach of conscience; they depend not on the praise of others: they refine and polish life; they soften the character; they sweeten the disposition; they make the poor rich and happy.

Let us endeavour to merit a national ovation, by setting about the essential work of preparation. A young gentleman of my acquaintance, when with a farmer in Cambridgeshire, for the purpose of learning the business of a husbandman, devoted much of his spare time to the instruction of the villagers amongst whom he was located. The kitchen was given up to him—a spacious room; and so soon as his intention of teaching all who might come became known, applications to attend upon his instructions were numerous to excess: he could not admit all that requested the favour. The novelty of his endeavour attracted many, who, so soon as their curiosity was gratified, retired, to make room for the more earnest. But when thinned of the indolent and the curious, a little band of thirty sincere competitors in the race of knowledge remained, and, during the winter months of two consecutive years, they made, under his care, very astonishing advances. I saw the class at its commencement, and again I saw it just before he left the neighbourhood, and certainly the change effected was marvellous. Out of the thirty scholars when first assembled, fifteen only could read, and these but indifferently. Under the system pursued by my young friend, they could, when he left, read with fluency and relish any ordinary volume. Out of the fifteen that could not read, and in fact did not know their letters, six were old men averaging sixty years of age, and the remainder were nearly all men of mature years. Four of these individuals, by steady perseverance, learned, within the period I have already mentioned, to read with ease, and to understand, anything that was placed before them; and the rest, although not so accomplished, could read so as to amuse themselves, and acquire much information.

Of the science of numbers, when I first visited the school, all the men without exception were profoundly ignorant. When the mystery, that always invests figures to the uninitiated mind was cleared up, and the first steps were comprehended, a vigorous race commenced that was most interesting to watch. One man reached far into Algebra; another diverged into Mathematical Problems; several pushed their discoveries amongst the enchantments of Vulgar Fractions; and before the class was broken up, the scholars were one and all clear of Compound Division, both Long and Short. The study of History in connexion with Geography—confined in both instances to our own country—was introduced as a pleasant recreation now and then, and excited great interest.

And this class and system of teaching was projected and carried on by a young man sixteen years of age. He had no one to help him, yet he kept perfect order in the room. Old men and lads of fifteen were under good command. No talking was allowed—nothing but steady quiet work. He made every one feel that it was to his own interest to make the best of the hours allotted to mental improvement. A spirit of rivalry seemed to infect the whole class, and the lessons that were taken home were without fail prepared before the next evening of assembly. This infection, indeed, spread amongst the women of the village, and a deputation of them waited upon my young friend, to know whether he would not instruct them on intermediate nights. This proposal, however, he thought it proper to decline; and I only mention it to show how anxious the poor are to secure those advantages of cultivation from which their position and circumstances unfortunately so often debar them.

In that village, where this benevolent effort was made, are now many families engaged every evening, to my certain knowledge, in quiet and intelligent pursuits, who would have been, and in some cases were formerly, far otherwise occupied. Beer-house companionship is cut, and a thousand other evil practices leading to penury and ruin—the invariable attendants upon ignorance and indolence—are mercifully avoided.

We little know how much the character of that village in Cambridgeshire owes for all time to come to the exertions—the simple, affectionate exertions—of a youth of sixteen!

Now for a united home thrust of the vulnerable neck of this Briarian monster vice! The example is worthy of imitation. Let us one and all do our utmost; and thus by individual, well-directed, and well-sustained effort, aspire to raise our country as far in moral character above the other countries of Europe ,as she stands above them with respect to her commercial enterprise.

F. R. S.

REAPING MACHINES.

At the meeting of the Berwickshire Farmers' Club, on the 5th Dec., a highly interesting discussion took place, part of which, on "reaping machines," appears in the present impression. The club, with the view of obtaining more accurate information than could be brought out during an ordinary discussion of the subject, furnished a list of queries to those members who had purchased reaping machines. The answers returned are all more or less interesting, and the following facts appear to be brought out by the individual experience of these gentlemen.

Mr. Dalgleish being furnished with two machines—one of M'Cormick's and one of Bell's, from Crosskill—found that—

M'Cormick's, in 40 hours, cut 37 acres, 20 acres of which were strong wheat.

Bell's, in 91 hours, cut 62 acres—oats, barley, and wheat.

Thus M'Cormick's overtook most in the same space of time, as being 37 to 31 acres in about 40 hours. This, however, appears not to be the only advantage, as with the grain cut by M'Cormick's machine 12 labourers lifted and bound from 10 to 12 acres per day; while where cut by Bell's machine 12 persons only overtook from seven to eight acres. Mr. Dalgleish states that he, along with the whole of his people, are decidedly in favour of Mr. M'Cormick's reaper, "it not being liable to go out of repair, while it was so easy work for the horses."

Mr. Turubull found that, with Bell's Crosskill he could cut and bind a crop at the rate of about 6s. per acre.

Mr. Hood found with Bell's Crosskill that he could not give any account as to the expense per acre from frequent stops and the necessity of repairing the machine. Mr. Hood does not, however, despair of Bell's reaper if it were "made of good stuff, and a little stronger."

Mr. Dove used Bell's original machine, knife cutters, and cut about 90 acres. The machine overtook only 5 acres per day. Mr. Dove calculates the expense of cutting at 8s. per acre.

Mr. Home, President of the Association, cut with Bell's machine, serrated cutters, at the rate of 7 acres per day. Calculated the expense to be 7s. per acre.

The opinion of Mr. Wilson, of Edington Mains, from the opportunities he has had at public exhibitions of thoroughly studying reaping machines, is entitled to great weight. Possessing himself of two of Bell's machines, one with knives, the other with a serrated cutter, he was in a favourable position to test the question of the respective merits of the two cutting apparatuses. The machine with the serrated cutter was less fatiguing to the horses, "less liable to derangement, and was altogether a superior sort of machine." He had cut with the two machines 150 acres, each machine cutting about 8 acres per day. He stated that he was "not prepared to give an estimate of the cost." Like every one who had tried the machines, he was much harassed by stoppages and breakages. Some of these could not be prevented, but others might very well be obviated by greater care and an improvement in their construction. Mr. Wilson and Mr. Dove found great advantage from allowing the crop to lie cut for some days previous to binding. This always appeared to us to be one of the advantages of Bell's reaper.

One remarkable feature of these trials in Berwickshire is the favourable position of M'Cormick's reaper. A few more successful experiments like those of Mr. Dalgleish, and attention will be again turned to this machine. One advantage it certainly possesses over Bell's—cheapness. In America it can be constructed for about the small sum of £5 sterling. Besides, it is easily repaired, which is not the case with Bell's machines, either with the serrated cutters or with the knives. One drawback—and it appears to be almost inseparable from Bell's machine—is inferior material and defective workmanship. If the question of compensation for furnishing a defective machine had been tried by some one of the members of the Berwickshire Club, we believe they would have performed a greater service to the cause of reaping by machinery than any one event which has occurred since the exhibition of Bell's machine at Perth in 1852. With complaints from the Haddington Club, reiterated by the Berwickshire Club, of inferior materials and defective workmanship, without some guarantee for the future, farmers will be shy in purchasing Bell's Crosskill machines. And some such arrangement, we think, should be entered into before another season. We have been subjected to taunts for our advocacy of machine reaping, the experience generally of farmers having fallen so much short of our predictions. We certainly did not calculate upon such contingencies as have occurred. But we take this opportunity of again asserting that our opinion is not at all changed—that the day is not distant when reaping machines will become as common as thrashing machines—and that both will be found indispensable adjuncts with the present position of the rural labour market.—North British Agriculturist.

THE GUANO TRADE.

Many persons can remember the mania that prevailed a few years ago for the discovery of guano islands, when numbers of vessels left London, Liverpool, and other ports, under sealed orders, to proceed to some fancy island, alleged to be rich in guano deposits, which were to make the fortunes of the shipowners and speculators. We have no desire to revive this silly speculation, which was stimulated by one or two crafty schemers, who lined their pockets at the expense of the merchants whom they gulled with their pretended information. It may not be amiss, however, to keep attention alive to the increasing demand for guano, and to point out the quarters in which there is any prospect of new discoveries being made.

Reports of deposits of guano on the west coast of America, in Mexico, and also on the Aves Islands, in the West Indies, have excited some interest among shipowners; and as freights to distant quarters are less remunerative than they were, it is not improbable that we may receive this year fresh supplies. The captain of an American schooner, called the Fawn, which has been engaged in this new guano trade to the United States, discloses some facts relating to it. It appears the island where he obtained his cargo was a very small one, without a name, in the Carribean Sea. When discovered it abounded in guano, which has since been almost all removed to the Baltimore market, and there sold as Peruvian—the discovery and the trade itself being kept a profound secret. This reminds us of what we have heard from sailors—that they knew of the existence of guano on many of the small uninhabited and nameless islands stretching along the southern coast of the Mexican Gulf and the Carribean Sea, especially off Yucatan. Very probably much of what is sold in the American markets as Peruvian guano has been obtained from this locality.

The guano trade has become of great and growing importance to the agriculturists of Great Britain, and in Scotland, at least, this valuable manure has proved a full equivalent to the occupiers of the soil for the loss of protection. In this view we are supported by the practical experience of Mr. George Hope, Fenton Barns, a leading farmer in East Lothian, who, in concluding an article on experiments with guano, which appeared in the "Transactions of the Highland and Agricultural Society of Scotland," says—"Indeed it is to the invaluable aid of guano that the farmers of the United Kingdom are mainly indebted for having been successfully carried through a transition state of doubt and difficulty, the approach of which few regarded without alarm, as it was not unfelt even by those who had strongly advocated the propriety of the change." The prosperity which the farmers have lately enjoyed in this country as well as on the continent—the large consumption of guano in the Mauritius, the West Indies, and the United States, will all tend to increase the demand for this valuable manure, which has now become a great staple commodity, and gives employment to over 200,000 tons of British shipping annually. The sunless lands of Great Britain, the rice fields of Italy, the vine lands of Germany, the exhausted coffee plantations of Brazil, and the arid plains of Peru, all testify to its fertilising properties. In 1851, 6,550 tons of guano were supplied to farmers from Leith; in 1852, 8,000 tons; in 1853, 13,500—showing an increase in the consumption there, as compared with 1851, of fully 100 per cent. Last year, we believe, nearly 50 per cent. increase was shown. In the Clyde, in December, there was a stock of nearly 4,000 tons ready for spring orders. It thus becomes a matter of first importance to the agricultural community—nay, we may go further, and say to the community at large—that sufficient supplies of guano be directed to our shores, at or under the current prices of the last few years; and although there is a general outcry in Liverpool, and some other quarters, against the monopoly in Peruvian guano, we have reason to believe that the farmers of the Lothians, and Scotland generally, are satisfied with the mode in which the business is at present conducted. The dealers buy cargoes from Messrs. Gibbs, and it is supplied to the farmers direct from the import ships, whereby they are always safe against adulteration or inferior quality. Prices, however, are now fully £2 per ton higher than last year—the price for Peruvian ruling at £11 to £12, whilst in January, 1854, it could be had at £9 5s. per ton.

The chief sources of supply recently have been, besides the Peruvian, from Calloe and the Chinchas direct, Bolivia, Cobeg, Port Desire, Sea Bear Bay, and other ports of Patagonia, Monte Video, Port Elizabeth, Latham Island, and Chili. The few small cargoes received from Chili and Patagonia have been eagerly purchased at high prices as compared with former years, and we learn that if supplies could be got of a similar description, they would yield a handsome return to importers. It is true they are less rich in ammonia than the Peruvian guano, but they contain large quantities of the next most important ingredient, phosphate of lime.

In the twelve years since guano first came into general use, we have imported about one and a quarter million tons from various parts. The question arises—how long the Peruvian supply, with the greatly increased consumption, will continue to meet the demand? The subject has been frequently agitated, and various estimates given of the quantity still available. From the Chincha Islands, at least 300,000 tons are now shipped annually to various quarters. Mr. M'Intosh furnished, through Admiral Moresby, in September, 1853, an estimate stating the quantity left on the Chincha Islands at under nine million tons. Mr. Peacock, who was a considerable time on the coast, states that, exclusive of the Chincha group, the Lobos, and other islands on the north-west coast of Peru, contain about five million tons, and believes that there are other known "guaneros" on the south coast containing some four or five million tons more. The French Government engineer, M. Faraquet, who surveyed the Chinchas a year or two ago, calculated the guano deposits there at twelve and a-half million tons. The Peruvian Government surveyor, Don Geronimo Fernandes, in January, 1852, published an official report, giving the quantity of guano available at eighteen million tons on the central or Chincha Islands, eight million tons on the south or Chipana Islands, and about one million tons on the north or Lobos Islands—twenty-seven million tons in all. These estimates are all very wide, and necessarily vague. But, taking a rough average, there may, probably, be some twelve million tons of good guano still available.

It is only in latitudes where little or no rain falls that the most valuable ammoniacal guanos are to be met with, and under the tropics there are two lines of rainless deserts around the globe. The continual disturbance of sea-fowl in the last few years has necessarily driven them to other islands and coasts, where fresh and most valuable deposits of guano will be found. In a paper recently read before the Society of Arts, by Mr. A. G. Findlay, are the following remarks:—

"Guano—by which is meant of good quality—has long been found in three districts, which it will be seen lie exactly in the same geographical and physical relation on the west side of the southern continent of South America, within the tropic, and near the tropic on the west coast of Africa, Ichaboe, &c., and Shark's Bay, West Australia—all free from any deterioration from rain in the first instance, protected therefrom by the Andes to the eastward, which, by intercepting one-half of the atmospheric circulation, prevents the rain reaching the west coast. It may be confidently assumed that guano will not be found in any other part of the world. I would draw attention to a district which I believe is as yet almost commercially untried, which might bring great benefit to agriculture and chemistry by the importation of native salts existing in enormous quantities. I refer to the Desert of Acatama, near the Pacific coast, between Chili and Bolivia. The existence of soda, either in the form of nitrate, carbonate, sulphate in addition to the common muriate, on the surface of this vast arid tract is a singular fact, owing to the absence of rain. The enormous wealth of the adjacent silver and other mines, developed since 1832, has eclipsed the value of these otherwise useful products. Numerous other mineral productions abound here, which perhaps the completion of the Panama railroad may bring more perfectly within the range of British enterprise."

There are several places in the Red Sea and the Gulf of Persia which are known to be rainless; and native vessels from the Red Sea are stated to visit some of the rocky islands on the east coast of Africa, to obtain the deposit of the numerous birds, which they use for a sort of cement in building. This fertiliser costs our farmers upwards of two millions a-year, of which at least two-thirds go to the Peruvian Government; but it is a satisfaction to know that, notwithstanding this enormous expenditure, the greater the outlay the greater are the advantages to the agriculturist, the ship-owner, and to the public at large.—*Shipping Gazette.*

CHICAGO THE GREATEST GRAIN PORT IN THE WORLD.

In the progress of our city, and of the west generally, facts of the most astounding character not unfrequently come upon us unawares, and before we are prepared for them. If any one had asked us two days ago which of the great grain depôts of the world (depôts at which grain is collected directly from the producer) was the largest, we probably would have named half a dozen before hitting upon the right one. If the same question were put to each of your readers this morning, we doubt if any one of the whole number could answer it correctly, nor do we believe that any one of the whole number would credit the correct answer to the query, unless it were sustained by an array of figures the truth of which could not be questioned. Our attention was called to this subject yesterday by a gentleman engaged in the grain business in this city, and with his assistance we have given it a thorough investigation, *the result of which, greatly to our surprise and gratification, establishes the supremacy of Chicago as a grain port over all other ports of the world!* That there may be no ground for incredulity we proceed to lay before your readers the statistics, gleaned from authentic sources, which confirm this statement. In the table which follows we have in all cases reduced flour to its equivalent in Wheat, estimating five bushels of the latter to one of the former. The export from the European ports are an average for a series of years—those of St. Louis for the year 1853, those for Chicago and Milwaukee, for the current year, and those for New York are for the past eleven months of the same year. With these explanations we invite attention to the following table:—

	Wheat, bush.	In. Corn. bush.	Oats, Rye, and Barley.	Total quarters.
Odessa	5,600,000	—	1,440,000	880,000
Galatz & Ibraila	2,400,000	5,600,000	320,000	1,040,000
Dantzig	3,080,000	—	1,328,000	546,000
St. Petersburg.		all kinds		900,000
Archangel......		,,		316,000
Riga		,,		500,000
St. Louis	3,082,000	918,384	1,081,078	635,125
Milwaukee ...	2,723,574	181,937	841,650	451,823
New York......	5,892,452	3,627,813	—	1,178,789
Chicago	2,946,924	6,745,588	4,034,216	1,715,840

By comparing the exports of the different places mentioned in the above table, it will be seen that the grain exports of Chicago exceed those of New York by 4,296,393 bushels, those of St. Louis by more than two hundred and fifty per cent., those of Milwaukee nearly four hundred per cent. Turning to the great granaries of Europe, Chicago nearly doubles St. Petersburg, the largest, and exceeds Galatz and Ibraila, combined, 5,406,727 bushs.

Twenty years ago Chicago, as well as most of the country from whence she now draws her immense supplies of breadstuffs, imported both flour and meat for home consumption; *now she is the largest primary grain depot in the world, and she leads all other ports of the world also in the quantity and quality of her beef exports!* We say the largest *primary* grain depôt in the world, because it cannot be denied that New York, Liverpool, and some other great commercial centres receive more breadstuffs than Chicago does in the course of the year, but none of them will compare with her, as we have shown above, in the amount collected from the hands of the producers.

What a practical illustration the above facts afford as to the wonderful, the scarcely credible, progress of the west—what an index it furnishes to the fertility of her soil and to the industrious and enterprising character of our people—what a prophecy of the destiny that awaits her when every foot of her long stretches of prairie and her rich valleys shall have been reduced to a thoroughly scientific tillage! How long, at this rate, will it be before the centre of population and of wealth will have arrived at the meridian line of our city, and Chicago will have vindicated her right to be recognised as the great commercial metropolis of the United States? We verily believe such is the destiny that awaits her.

W. KERNAGHAN.

THE CHARACTERISTICS OF WHEAT.

BY AN OLD NORFOLK FARMER.

Our next task is to consider the commercial peculiarities of this grain, in which respect also it occupies a very important station, entering largely into the calculations and statistics of all commercial nations, both ancient and modern, as contributing, in an extensive degree, to both their public and private resources. Whether we view this part of the subject in respect to its high antiquity, the great and various interests it involves, the vast amount of capital it absorbs, or the number of persons for whom it furnishes profitable employment, we may safely affirm that there is no production of the earth that contributes so largely by its commercial influence alone, to the well-being and support of mankind.

It is impossible, in the space afforded by this medium, to extend our inquiries on this question to the general commerce of the world in this grain: this would involve a series of calculations far beyond the limits allowed in the columns of a newspaper. For the sake therefore of brevity, we shall confine our observations principally to those facts furnished by the wheat trade of the United Kingdom, with such allusions only to that of foreign nations as are necessarily involved therewith. We flatter ourselves these will be found amply sufficient to prove the importance of this grain in a commercial point of view, by reason of the characteristics with which it is invested.

We shall therefore consider the cereal wheat in regard to its priority in commerce of all other products, its universal diffusion, the amount of capital it absorbs, the numerous interests it embraces, and the number of hands for whom it furnishes employment.

First: So far as the British isles are concerned, the commerce in wheat takes the precedence in point of antiquity of every other kind of produce. We have already shown the probability that, previous to the conquest of Britain by the Romans, foreign commerce was scarcely known amongst its inhabitants, and that soon after that event wheat was cultivated in sufficient quantities to admit of its being largely exported. Thus, as soon as the natives came into contact with civilization, this commerce commenced; and although no authentic records were preserved of the quantity of wheat exported, we have reason to believe it was sufficiently large to be of considerable importance to the British cultivators of the soil. What it is in the present day we shall have occasion to show as we proceed.

Secondly: The universal diffusion of wheat over so large a portion of each hemisphere is a peculiarity which entitles it to the first consideration in a commercial point of view. Other cereals, such as rice or maize, have only a local importance as a necessary of life; but wheat is emphatically "the staff of life" throughout the vast regions of the earth lying between 60° north and 60° south of the equator, with the exception of a belt on each side of the line and within the tropics, and even there it is cultivated with success on the high grounds at certain elevations on the seaboard. Were its cultivation attended to, with the same sedulous care over these vast zones, as it is in the British isles, we may safely assert that, in all human probability, there never could be such a calamity as a famine of bread in any country where commerce is free. This is a consideration worthy of the first place in the minds of statesmen; for in it is involved the safety and welfare of the most numerous, but most helpless, class of mankind, and especially of this country, where bread constitutes so large a portion of the sustenance of the poor. During the last year we have felt the social as well as the commercial benefit of this universal diffusion of wheat, and shall undoubtedly, if the war continues for any lengthened period, feel it still more beneficially in future. But our commerce in wheat with foreign countries has had a remarkable reflex action upon the home commerce. The competition of the British farmers with the foreign growers has stimulated production with the former to such an extent, that an increase that would have been considered quite apocryphal a few years ago, is now commonly obtained; and there is reason to believe that we are still far from having reached the maximum. On the other hand, the certainty of the British granaries being open at all times to the reception of foreign grain, has rendered this country the depôt and emporium of the commerce in wheat for all Europe, or rather for the whole world. Under any circumstances, therefore, except the very improbable one of an universal failure of the crops, we can never in future, in all human probability, fail of obtaining an adequate supply of bread corn. At the same time, it is clear that the British farmer can grow wheat at as low a price, or even a lower, taking expenses of transit, &c., into account, than that at which it can be imported from abroad.

The adaptation of wheat for storing is not one of the least important of its peculiarities in connection with its general diffusion. If laid in granary in a *perfectly dry state*, it will keep good for eight, ten, or even twelve years. Another minor peculiarity, in which it differs from every other cereal, is, that when stored in granary, *it increases in measure*, whilst it loses in weight—at least, up to a certain period, and according to the condition in which it is stored. The cause of this is, that the skin acquires a rugosity, which prevents the grain from closing so intimately in the bushel as when fresh-thrashed. We have known twenty quarters of wheat, after lying a few months in granary, exhibit an increase of nearly a quarter, or five per cent. This increase, however, will in some degree be determined by the weather, being greatest if re-measured when the atmosphere is damp.

In the Danubian provinces and in Poland the usual method of storing wheat formerly was by digging a trench near the banks of a navigable river, into which the grain was thrown and trodden down quite hard, raising the heap to a ridge above the ground, in much the same way as potatoes are stored in this country. No covering was put over it, but the sides of the slope were beaten hard and smooth from time to time, and being exposed to the sun and rain, the upper grain of course sprouted, and soon formed a matted covering impervious to the atmospheric moisture, and keeping the bulk perfectly dry. In this state it remained until a demand for western Europe presented a market. In general, however, the grain thus preserved acquired an earthy taste and smell; and of late years, more care is taken both in the preservation and the cleansing of the wheat in that part of the world.

CAPITAL EMPLOYED.—This is the most important, and at the same time most difficult question to ascertain of anything connected with this cereal. It is, indeed, impossible to give a correct statement of the amount absorbed in the commerce of this article from its production by the farmer to its consumption by the baker; and the utmost we can do is to trace its passage through the various stages, and, from the best information we can obtain, deduce a proximate estimate of the capital employed in each branch. We have therefore to consider the capital of the agriculturist, the merchant, the ship-owner, the miller, and the baker.

First, Agricultural Capital. Estimating the present consumption of wheat at 21,000,000 qrs., and the importation from abroad at 5,000,000 qrs., it leaves 16,000,000 qrs. as the produce of the country. Divide this by 3½, as the average quantity grown per acre, and we have an annual breadth of 4,517,428 acres. In cultivating this grain we cannot reckon the capital employed at less than ten pounds per acre, namely, six pounds fixed, and four pounds floating. This may appear a large allowance, but when it is considered that the wheat crop is that on which the farmer chiefly depends for his profit—that frequently a considerable portion of the other crops are sacrificed to a preparation for it, and that a more expensive manure is usually applied, our estimate will not be deemed extravagant. We therefore have 4,517,428 × 10=45,174,280 pounds sterling employed in the production of 16,000,000 qrs. of wheat; of which three-fifths, or £27,000,000, is reckoned as the fixed, and two-fifths, or £18,000,000, the floating capital, being the expense, including rent, attending the cultivation. This latter allows 22s. 6d. per qr. for the cost of the crop, leaving for the profit of the farmer whatever he may obtain over and above that sum.

Secondly.—We have next to calculate the capital of the merchant employed in the commerce of the 5,000,000 qrs. of imported wheat; and we estimate this at one-fourth of its value, or 1,250,000 qrs. at 50s. per qr., giving a capital of £3,125,000; or, in other terms, a three months' average stock in the hands of the merchant.

Thirdly.—Next in order comes the shipowner; and here we have not only to consider the tonnage engaged in the transit of the 5,000,000 qrs. of foreign wheat, but also that employed in the coasting and inland conveyance of that grain. The former or foreign shipping we estimate as follows: 5,000,000 qrs. of wheat, at 60 lbs. per bush., will weigh, say in round numbers 1,100,000 tons; and supposing, on the average, that corn vessels make four voyages per annum, it gives an aggregate of nearly 280,000 tons employed in the transit of foreign wheat. Three months may be thought a long period for each voyage; but when it is considered that a large proportion of the supply comes from the Black Sea and America, that time will not be thought too much. Most of the Black Sea corn-vessels, also, go out in ballast; and are, besides, frequently detained for weeks at the various ports.

With respect to the coasting and inland water-conveyance of wheat, we have but few data to direct us; but from what can be gathered from the arrivals at the principal markets and outports, we think it may be estimated at 10 per cent. of the whole consumption, whether in wheat or flour; this will be 2,100,000 qrs., or 450,000 tons: and if we further reckon the coasters and inland traders by canal to make, on the average, two voyages per month, we shall have 450,000 divided by 24=18,750 tons; and if we estimate them at an average of £7 per ton, it will give £131,250 sterling. This we must add to the foreign marine of 280,000 tons, at £12 per ton, or £3,360,000; making an aggregate fixed capital of £3,491,250 employed in the transit of wheat alone. The floating capital of this section we estimate at £1 per ton, or £398,750.

Fourthly.—The mealing department next claims our attention, being, in fact, the most complicated part of the subject, owing to the objections on the part of those interested to affording the necessary information, which has compelled us to depend chiefly on our own knowledge and experience, with such hints as we have been able to deduce incidentally from other sources. We shall therefore pursue the following plan:—

1. We estimate the consumption of wheat of the United Kingdom at 21,000,000 qrs., which allows one sack of flour of 280lbs. per head.

2. A pair of 4 ft. stones will grind at the rate of three bushels per hour, which, on the presumption of driving eighteen hours per day, gives 54 bushels, or 6¾ qrs. for the day's work. If we deduct the Sundays, and the time allowed for dressing the stones, and other casualties, we reduce the working days to five in each week. We shall therefore have 260 + 6¾=1,755 qrs. as the work of one pair of stones for the year. We must then divide 21,000,000 by 1,755, and the result will be 11,966 pairs of 4 ft. stones required for grinding the entire consumption of wheat for the United Kingdom.

3. We estimate the buildings (including dwelling-house and offices), machinery, going gears, stones, utensils, sacks, &c., of a mill at £500 per pair of stones—that is to say, a water or steam mill, with six pairs of stones ready for work, with dwelling-house for the miller, will cost £3,000. If, therefore, we multiply

11,966 by 500 we obtain £5,983,000 as the fixed capital employed.

4. The floating capital consists in stock and book-debts. The former, in wheat, flour, and offal, we take at two months' consumption, or one-sixth of 21,000,000 qrs., which, on an average of 50s. per qr., gives (21,000,000,divided by 6=3,500,000 at 50s.)£8,750,000. The book-debts we estimate at an average of two months' credit. The wheat being now converted into flour, we therefore divide 28,000,000 sacks by 6=4,666,666 sacks, at 45s., £10,499,998. We thus arrive at the following summary:—

Fixed capital	....	£5,983,000
Floating do.	Stock	8,750,000
	Book-debts ..	10,499,998
		£25,232,998

It is necessary to remark here that we include in this estimate the flour-factors, whom we consider as the agents of the millers. And although many of these may take the risk of debts, charging a debendere to the miller, the latter also, in general, gives them two months' credit, or draws upon them at that date. We are aware that the *nominal* credit *given* to the baker is one month; but we also know too well that the credit *taken* by them more generally extends to from two to four months, and that comparatively few confine themselves to one month.

Lastly, we have to estimate the capital of the bakers, which we do as follows:

Dividing the consumption of 28,000,000 sacks of flour by 52, we obtain the number of 540,000 sacks per week. If we further divide this by 10, for the average number of sacks baked by each, we shall have 54,000 bakers. But as, in the country, and amongst farmers particularly, the housekeepers "bake at home," we allow a deduction of 14,000 from that number, which leaves 40,000 bakers for the United Kingdom. The value of the houses, offices, ovens, and utensils in trade we estimate at £300 each, which gives an aggregate of £12,000,000 as the fixed capital employed in the baking trade. The floating capital, or stock and book-debts, we reckon at one month's consumption, or 2,333,333 sacks, which, on the average of 45s. per sack, amounts to £5,249,999, making the capital employed in baking as follows:

Fixed capital	£12,000,000
Floating ditto	5,249,999
Total..........	£17,249,999

Our general summary, therefore, is as follows:

CAPITAL EMPLOYED IN THE WHEAT TRADE.

		£	£
Agriculture..........	fixed	27,000,000	
	floating ..	18,000,000	
			45,000,000
Mercantile			3,125,000
Marine	fixed	3,491,250	
	floating ..	398,750	
			3,890,000
Milling	fixed	5,983,000	
	floating ..	19,249,998	
			25,232,998
Baking	fixed	12,000,000	
	floating ..	5,249,999	
			17,249,999
Total...............			£94,497,997

Having gone through what relates to the natural history, the production, and the commerce of the cereal wheat, showing its *beneficial* and *extensive* influence on the various classes of society, from the first committal of the seed-corn to the ground, to the manufacture of its produce into the staple article of food, it only remains for us to show its moral and social characteristics, as bearing, in its use, both directly and indirectly, on the progress of civilization, and tending to promote the elevation of our species in the scale of existence.

The operations and arrangements of Nature, in the formation, sustentation, and final disposal of the animal as well as vegetable creation, have been uniform and continuous from the foundation of the world to the present hour. The earth is the acknowledged "mother" of all living things, and the source from whence they derive the means of a prolonged existence; and when the mission to which they were appointed is fulfilled, it is to her bosom that in one form or another they are again consigned.

Nor is man, "the lord of the creation," able to boast—so far, at least, as his material nature is concerned—a higher origin, a more refined source of sustentation, or a more noble end. Although, through the wisdom and goodness of his Maker, who "breathed into him the breath of life," a distinguished status has been appointed for him in the sphere of the material world, and a still more exalted destiny in the world of spirits hereafter, these superior advantages have in no respect, exempted him from the ordinary laws of organic existence. Respecting *him* also, the decree has gone forth—'Dust thou art, and unto dust shalt thou return;" and in accordance with this fiat, he enters upon life in feebleness, like the rest of the animal tribes, rises, flourishes, and decays; and when *his* mission is accomplished, and the time appointed to him expired, his mortal remains resolve themselves again into their original elements, and mingle with the common mass of inorganic matter, to reappear, at some future period, in new forms of grace, beauty, and utility.

It was wisely ordained, that man should subsist on the fruit of his own labour; that the bounteous universal parent, should yield her stores, only to the exercise of the skill and industry of the being, whose superior powers and faculties have given him dominion over the whole material creation; and that, on the persevering and intelligent exercise of those powers, should depend, *as a general rule*, the amount or degree of benefit he should derive from those stores. "The hand of the diligent maketh rich, but the sluggard lacketh all things." And thus, by a just retribution, whilst the use of the talents bestowed upon man, brings its own reward, their neglect entails poverty and want, misery and distress, in all their complicated and destructive forms.

It is now a well-established fact, that, in proportion as civilization is extended, the food with which man is sustained is improved in quality, and increased in quantity and variety. The investigations of science, and the enterprises of commerce, during the last hundred years, have thrown great light upon this subject, by revealing the condition of the nomadic tribes in different parts of the world. The dreamy sentimentalities of Godwin, Rousseau, and other pseudo-philosophers of the latter end of the last century, respecting the "innocence and happiness of man in the savage state," have been dispelled by these investigations; and like the form of Satan at the touch of the spear of Ithuriel, the wandering barbarian starts up before us, in all the deformity of unrestrained passions and propensities, and all the misery of unreflecting improvidence. In regions farthest removed, or wholly shut out, from intercourse with civilized life, not only is the mode of existence so precarious as to exclude the possibility of the natural increase of the species, but the means of sustaining life are of the most disgusting and repulsive description. Thus, in Australia, such are the exigencies of human existence, that worms, grubs, and other nauseous reptiles, are the common food of the natives, who are found to be wholly destitute of a knowledge of agriculture even in its most simple form. This, perhaps, is the completest case of barbarism of which, at present, we have any knowledge. But, as we ascend from them, through the various gradations of civilization, we shall find the degree of that condition distinctly marked, and rising in proportion as the food becomes more choice, more abundant, and more varied; and that whilst in the state, of utter barbarism, the precariousness of the supplies places the wandering tribes between the extremes of to-day's abundance or excess, and to-morrow's destitution, those higher exercises of the mind, which dictate reserve in the first case, as a provision against the second, are as dormant as if they had no existence.

Agriculture is the precursor of all the arts of civilization, the foundation of commerce, and the basis of national wealth. Of itself, it implies a property in the land—whether permanent or temporary is no matter—which at once raises the possessor in the scale of society, and rescues him from barbarism. Closely connected with, but more humanising than the pastoral life, it was practised by the patriarchs from the earliest ages; and we may trace its ameliorating effects in the history of those venerable men. Where, even in the present day, can we find a greater real refinement of manners, more enlarged benevolence, or more sterling integrity and independence, than were displayed by Abraham in the purchase of the land for a burial ground,* or in his yielding to his younger brother Lot the choice of pasturage for his cattle?† What can be more touchingly fine than the salutation of Boaz to his reapers, or his injunction to them to "drop the handfuls of ears" for the poor widow's daughter?‡ In numberless instances in the oldest history extant, we find proofs of the beneficial influence of the cultivation of the ground upon the character of man, in promoting the exercise of benevolence, and the higher qualities of the mind.

But we need not go beyond our own times for proofs of this influence. With the advance of agriculture towards a science, we find, necessarily, an improvement in the character of those who conduct it. In this respect, England has taken the lead of all the world, and has both cultivated and consumed, the largest amount of the most expensive products of the earth, particularly wheat, of any country; and we find a corresponding amount of intelligence and civilization as the result. In Ireland, the potato for many years constituted the almost entire food of the rural population, some of whom tasted nothing else, from one end of the year to the other. The consequence of thus living on the same food, and frequently under the same roof, as their pigs, was to lower and brutalise the social standard of character, and to destroy that spirit of enterprise, which is an essential element in individual, as well as national prosperity.

On the continent of Europe the lower classes subsist chiefly on the inferior cereals, as maize, rye, barley, oats, buckwheat, &c. Even in France, the farmers who cultivate the wheat are generally too poor to eat it, except in its coarsest form, and then mixed with more inferior grain. This is shown by the consumption of wheat in that country, which, with a population of 36 millions, is about 17 million quarters; whilst in England, with a population of 27 millions, the consumption of wheat is at least 21 million quarters. In Russia and Norway, rye and buckwheat constitute the principal food of the bulk of the inhabitants, and at times, a still coarser food is prepared from the bark of certain trees, which, although to a small extent nutritious, is anything but palatable, and can only be tolerated in a country where civilization is at a low ebb. In Germany, wheaten bread is only eaten by the upper classes, rye and barley constituting the principal food of the rest. In the countries more south and east, maize is, in a great measure, substituted by the lower classes for rye, &c.; for although wheat is grown in considerable quantities, it is too great a luxury for any but the rich, and what they do not consume is exported to England or France. In Asia, although in many parts wheat may be, and is, grown to a certain extent, it does not constitute the food of the masses of the people." In Persia and Northern India, Arabia, Nubia, Egypt, and Barbary, although great quantities of wheat are grown, particularly in the Delta of the Nile, maize, rice, and millet are the principal food of the people. In these genial climes and fertile lands, but little skill or industry is required to produce a crop. In Egypt, after the subsidence of the Nile waters, the seed-wheat or barley, &c., is scattered over the mud. If this has become dry, the seed is lightly ploughed or harrowed in, which is the extreme of labour bestowed upon it, until harvest arrives. The produce of wheat is very great, but its consumption is here also confined to the wealthy.

In China and Japan, rice is the chief food of all classes. The land is well-cultivated in these countries, and agriculture has been a special object of the attention of the Chinese Government for many centuries. In some respects they have been in advance even of our own agriculturists, as, for instance, in draining the lowlands by simple hydraulic means, and collecting the water thus raised into canals for the purpose of irrigating the uplands. The beneficial influence of this attention and respect, paid by the Chinese authorities in all ages to agriculture, is seen in the high degree of civilization to which that people have attained, which, although widely different from that of Western Europe, from causes which it would be out of place here to refer to, raises them far above many of the European States in social economy. The immense population, however, of that empire chiefly subsist on rice; whilst the richer classes, with that grain, indulge also in an endless variety of luxuries. The restriction of the former to so inferior a species of food, has the effect of repressing and degrading the mind, and perpetuating that semi-barbarism, which slavery in all countries induces.

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* Geneses, ch. xxiii., from 8 to 18 v.

† Ibid, ch. xiii., from 7 to 9 v.

‡ Ruth, ch. ii., 4, 15, and 16 v.

In Africa, rice and maize are used by the bulk of the people indiscriminately, with the exception of Egypt and Nubia. In South America, maize is almost the only food of the great body of the natives; and even in North America, especially in the Southern States, the same grain is eaten by all classes, as well as wheat. But the abundance of other kinds of food, and the vast variety of ways in which maize is prepared in the "States," render its use, even if it were more exclusive, less influential upon the manners of the lower classes.

We have thus, very slightly, taken a survey of the means of subsistence of the principal countries of the world; and if the history of the condition of each, is considered in connexion with the quality of the food by which the bulk of its inhabitants are sustained, we must come to the conclusion, either that the political and social condition of the people compels them to have recourse to the most ordinary description of food, or that the use of that food tends to lower and enslave the mind; whilst a more wholesome and expensive diet would have a corresponding beneficial influence.

It is probable that both these causes may operate at once, and upon each other. But it is nevertheless certain that the use of the most generous diet has an elevating effect upon the mind, and that in this respect the general use of wheaten bread, as the most nutritious vegetable food, in substitution for a less expensive and less wholesome food, wherever it has prevailed, has tended to elevate the character and condition of the people, and fit them for a better discharge of all the moral and social duties of life. We shall close our sketches with an extract from a modern publication on the subject.

"We propose, as far as can be accomplished within narrow limits, to trace the progress of our own country, towards one of the chief objects and indications of civilization—that of obtaining an abundance and a variety of wholesome and agreeable vegetable food, at the cheapest rate, and with unfailing regularity for increasing inhabitants. This great object is principally accomplished by the natural progress of a people in knowledge and industry. It is advanced by good commercial laws; it is retarded by bad: but if the general laws of a country have the effect of rendering industry free and property secure, it will go forward without the assistance of governments, and in spite of that assistance, too often misdirected—an embarrassment instead of a help. As we trace this advance of civilization, we first find that famines, once the unfailing scourges of a country, occur at longer and longer intervals, till at last they disappear altogether. We next perceive that seasons of scarcity, producing much severe misery, though not to be compared in their desolating effect to famine, become also fewer and fewer. Lastly, we discover that, though the great necessary of life, bread, may be dearer in one year than in another, the fluctuations in price are seldom extreme, and never sudden. If we investigate the causes of these remarkable circumstances, which always attend a very advanced state of society, we shall find that they are not to be ascribed to the vigilance of the soundest legislation, or to the provident foresight of the wisest ministers, but to the spirit of commerce, pursuing its natural course, without interference from the cumbrous aid of a government, or the opposing prejudices of a people. When a nation has become accustomed to the best food, instead of habitually resorting to the lowest, which it can only do by its steady but certain progress in industry, and a taste for comforts—when the intercourse between all parts of a country is certain and rapid—when large capitals may be safely and profitably employed in storing corn, in seasons of abundance, to meet the exigencies of a season of scarcity—when such vegetable productions of other lands, as will endure to be naturalized, can be grown in plenty at every man's door—and, lastly, when foreign commerce places the natural productions of every country within our reach, in exchange for our own natural productions—then, and not till then, can a nation be said to be so advanced in civilization, as to have secured, as far as possible, a constant supply of the best vegetable food that the earth can furnish, at a price accessible to the great mass of consumers."[*]

THE NEW SUGAR PLANT.—The scarcity of corn in France has drawn attention to a new plant, recently introduced from China, which promises to supersede to a certain extent the use of beetroot in the manufacture of sugar and the distillation of alcohol. The Agricultural Committee of Toulon has recently addressed a report to the Minister of War, with respect to the uses of the plant in question. It is called the *sorgho*, or *holcus saccharatus*, and was introduced into France in 1851, by M. de Montigny, the French consul in China, who sent some grains of the seed to the Government. Since then the culture of the plant has been commenced with success in Provence, and promises to be of great advantage to Algeria. The *sorgho* has been called the "sugar-cane of the North of China," and numerous experiments have recently been tried, with a view to ascertaining if it possesses the properties necessary for producing a crystallizable syrup, so as to become a rival to sugar-cane and beetroot. According to the report of the Toulon Agricultural Association, it would appear to have those properties. The fact has been ascertained by a series of experiments made in the department of the Var. It also appears to be richer in the saccharine principle than any known plant, excepting the vine. Beetroot contains from 8 to 10 per cent. of sugar; the *sorgho* produces from 16 to 20 per cent., from which 8 to 10 per cent. of pure alcohol, fit for all industrial and domestic purposes, can be produced. The refuse is excellent food for cattle, who are very fond of it. The plant grows with great rapidity, and does not require irrigation. The *sorgho* is not a new discovery, as it has been used from time immemorial by the inhabitants of the North of China, by whom large quantities of sugar are extracted from it. But this is the first time it has been introduced on anything like an extensive scale in Europe.

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[*] C. Knight's "Food of Man," vol. i., p. 8.

PERUVIAN BARLEY.

SIR,—A few weeks back we drew attention to the great productiveness and good properties of this early, skinless, and heavy variety of barley, compared with the common kinds in cultivation. We grew half an acre of it last season by the common process of cropping at one bushel of seed per acre, which planted too thick, and consequently resulted with but partial success. We also grew on another smaller portion of land from single grains at one foot apart square, and not exceeding three pints of seed per acre, and the result of this was, not one plant failed to produce 20 ears, and most of them 30, averaging not less than 70 perfect grains in each ear, or 1750 fold, equalling, of course, 1750 times as much per acre as was sown, viz., 5250 pints, or 82 bushels 1 quart. In drawing further attention to the merits of this prolific and heavy barley, we beg your indulgence to add, if your time and space admit, as corroborative of our former statement of it, and for the furtherance of agricultural pursuits, the following testimonial communication, which we have received from one of our northern correspondents, who states that it is grown pretty freely in Scotland. To be candid however, it may be fair just to observe that notwithstanding the superior value, weight, and prolificacy in the ear of the Peruvian Bere, the common barley, though of less value, surpasses it in tillering, and a greater bulk may be obtained, if ample space and time are allowed for it to grow, it being a larger and coarser grain. A few years ago we grew on one stub 80 perfect ears of common barley 2400 fold, which was received from us with thankfulness by the Royal Agricultural Society of England.

Maldon, Essex. HARDY AND SON, Seed growers, &c.

PERUVIAN OR SKINLESS BERE.

TO THE EDITOR OF THE ABERDEEN JOURNAL.

SIR,—In attempting to improve the cereal products of any district of country by the introduction of hitherto unknown or uncultivated varieties of grain, it will be found that numerous obstacles lie in the way. And unless it can be satisfactorily shown by a collection of facts illustrative of the greater productiveness of these species, and the uses to which they can be applied, the difficulty is increased still more. A few years ago we had our attention re-directed to what is now known as "Peruvian or Skinless Bere;" and from observations and experiments since made, we are so convinced of its productiveness and adaptability to our northern soil and climate, and of its superiority to the usual kind cultivated for either milling or malting purposes, that, with your kindness, we shall lay before your readers the facts we have ascertained regarding it. With the view of rendering this necessarily short sketch as complete as possible, it may be proper, first, to describe its

SPECIFIC CHARACTER AND HISTORY.—Ear two and a-half to three inches long, six-rowed, regular; number of grains in each ear varying from sixty to seventy-two; grains, pointed or angular, and naked; awns upright, about three and a-half inches long, adhering to the under paleæ or husk.

Introduced by the Earl of Lonsdale, in 1849, a friend of his Lordship's who had gone out and settled in Peru having sent him over a quantity of it. In 1850, Messrs. Lee, of Hammersmith, obtained the produce, and distributed it over the country in small quantities. In its botanical characters we find it precisely identical with the *Hordeum gymno-hexastichum* of Professor Low, as described in his "Elements of Practical Agriculture," 4th ed., p. 347. It is also exactly similar to a kind of Bere obtained from the Cape of Good Hope, about thirty-five years ago, and cultivated in this country for several seasons, which, curiously enough, during the first year of its cultivation, when the grain was ripe, dropt the awn; but in the second year it became quite persistent on the paleæ or husk, and that character it afterwards retained permanently. It corresponds also to the Siberian Barley described in "Miller's Gardeners' Dictionary," introduced in 1768, but neglected from some unaccountable cause. It must be distinguished, however, from a four-rowed naked Bere or Barley, which is inferior in several essential points.

PRODUCTIVENESS.—The produce on the Earl of Lonsdale's farm was enormous, being at the rate of 10 quarters to the acre, and the weight of the grain 63lbs. per bushel. It was grown on very light land, of a black nature, and highly farmed. Several agriculturists in this neighbourhood have also given us satisfactory evidence on this point. Arthur Harvey, Esq., of Killygreig, writes us that "on the 17th of March, 1851, he had an imperial acre sown down, broadcast, with 1½ bushels; but a severe snow-storm falling during night, previous to its being properly harrowed in, it remained comparatively unprotected for nearly three weeks, and he believes little more than the half of the seed sown grew. Notwithstanding this, however, the produce turned out to be three and a half quarters of marketable grain, weighing 58lbs. per bushel." The date of reaping was 10th of September. In reference to this case, Mr. Harvey farther writes, "that the bere tillered beautifully, with fine strong straw, standing nearly as high as Hopetoun oats, which grew beside it, not a stalk falling. Many plants I counted with 14 full heads, of 72 pickles each, on a single stool." On a farm in the Buchan district, three imperial acres were sown down last season, with eight bushels, which produced a total return of seventeen and a half quarters, weighing 60lbs. per bushel. Mr. Black, factor at Ellon Castle, also tested its superior productiveness, by having it grown in 1850, on different farms on the Ellon estates; and last season laid down a Scotch acre with four bushels, which realized a produce of ten quarters, weighing fully 59lbs. per bushel.

USE IN MALTING.—Before making any experiment with it as a malting grain, we considered it advisable to obtain from the Commissioners of Inland Revenue a declaration respecting the duty leviable, in order that maltsters might be relieved of individual responsibility or risk. Our communication was at once attended to, and produced the following satisfactory document:—

Inland Revenue, Somerset House, London,
December 18, 1852.

Gentlemen,—I am directed to acquaint you that the Board have very fully considered the question which you have brought under their notice, as to the rate of duty at which malt made from the Peruvian grain—samples of which you forwarded for their inspection—should be charged; and that they are of opinion, founded on the reports of competent persons, that the grain in question is a species of bere, or bigg, and that malt made from it in Scotland and Ireland will be chargeable only with the lower rate of duty.

I am, gentlemen, your obedient servant,
(Signed) J. Clayton Freeling.

Messrs. Benjamin Reid and Co., Aberdeen.

Since receiving this communication, we have had the malting properties of the bere very satisfactorily tested through the assistance of Mr. Eddie, brewer, Virginia-street. In conducting this experiment, Mr. Eddie was anxious to prove, more immediately for his own satisfaction, whether in the use of Peruvian bere for malting purposes there would follow any advantage over the common kind. Accordingly, he employed four bushels of malt of fair average quality, weighing 40lbs. per bushel, made from common bere. The extract, obtained when examined at a temperature of 60 deg., was 184 gallons of 21lbs. density, according to Allen's saccharometer. Mr. Eddie then employed, with similar accuracy of manipulation, an equal *bulk* of malt made from Peruvian bere. This malt weighed, however, 44lbs. per bushel, and the extract obtained, when examined at a temperature of 60 deg., was precisely 184 gallons of 26lbs. density. The relative value, therefore, of the Peruvian bere over the common for brewing purposes, as calculated from the difference arising out of each extract, is as 21 to 26, or fully 16 per cent. But, supposing weight for weight in place of bulk for bulk of each kind of malt had been employed, a difference of fully 6 per cent. would have still resulted in favour of the Peruvian bere. Again, if the Peruvian malt had been used in distillation, its superiority would have been still more apparent. As every 100 gallons of wurts of 5lbs. density gives one gallon of proof spirits, the extract obtained from the Peruvian malt, being 184 gallons of 26lbs. density, would give 9 17-32ds gallons, or at the rate of fully 2⅓ gallons of proof spirits for every bushel of malt. As a distiller has a short process of malting, and would employ a large quantity at a time, he would no doubt increase materially the amount of extract; and hence we understate the value of Peruvian bere for distilling purposes, rather than overstate it. Mr. Eddie assures us that the malt is excellent; and his affirmation is attested by other practical judges, who have expressed to us their willingness to purchase this bere from the farmer, when it is offered in sufficient quantity, and at a marketable price. We bring forward one other additional proof out of many. The original exporter of the grain, having established a brewery in Peru, tried its malting properties there, and, finding it good for the purpose, is now no longer under the necessity of importing from England, as he had hitherto done.

Use in Milling.—Several instances are known to us of its having produced a superior quality of meal, with a more profitable return in quantity than the common kind. In 1851, Mr. Harvey, of Tillgreig, milled half a quarter against half a quarter of other barley, and found the Peruvian to turn out, weight for weight, more meal. At Ferryhill Mills, a quantity was also recently milled. In this case, it yielded of excellent meal 92.55 per cent.; waste, 7.45 per cent. Of pot-barley, 64 per cent.; dust, 36 per cent. In Miller's "Gardener's Dictionary" it is described as yielding 60.6 per cent. of flour equal to London seconds; 30.3 of a coarser sort; and 9.1 per cent. of bran superior to wheat. The flour made excellent bread, both by itself and when mixed with wheaten flour, and was more retentive of moisture than wheaten bread.

General Remarks.—It will be gathered from some of the preceding statements that about three bushels of seed are amply sufficient to sow an imperial acre. We may state, as the result of experience, that, if sown too quickly, not merely will the straw be diminished in bulk, but the grain produce will also suffer proportionately in weight and quantity. In regard to the mode and time of sowing, the usual methods adopted in sowing common bere or barley may be followed with every confidence. It has been found in most cases to ripen rather earlier than either of the latter. In harvest-time it should be well looked to, and not allowed to get too ripe before being cut down, as the straw, otherwise abundant and good, might become slightly brittle, and therefore of less value.

In directing public attention to this grain, we have only further to remark that, from the uniformly-consistent reports we have had of its superior productiveness, from the little trouble it gives in threshing and dressing, from its value if used for feeding, and from its having been proved by actual experiment to be well adapted for all purposes to which bere or barley are usually applied, we have no doubt, if accepted by the agriculturists of this quarter, it will prove itself a valuable cereal auxiliary. Mr. Harvey, of Tillygreig, whose agricultural experience is extensive, and whose opinion is therefore valuable, writes to us the other day thus favourably of it: "In respect of produce of this, as tried against other barley, I have, both in 1851 and 1852, a larger proportion to the acre of Peruvian than of other barley, *in quarters*. I have a weight per bushel extra; I have equal bulk of straw; my grass offers better where it grew; it has been earlier; it does not shake more readily, though, the awns being very brittle, it is easily divested of them when fully ripe, and which may cause the careless observer to think it is apt to shed its seeds. It is not apt to lodge, and it is less trouble in dressing, when brought into the mill, requiring no hummelling."

We beg to thank you for the space you have afforded us in your paper, and remain, your faithful servants,

Ben. Reid & Co.

Aberdeen, 94, *Union-street*, *March* 14, 1853.

AGRICULTURAL STATISTICS.—As the present experimental collection of agricultural statistics will in all probability lead to a much more extensive inquiry on the subject, it may be interesting to the farming community generally to be informed how the system has been found to work thus far. The West Riding of Yorkshire is one of the counties selected for the present trial, and it is satisfactory to state that the investigation generally is being met in an intelligent spirit by the tenant farmers, and in all probability but for the non-conformity of some leading occupiers, from whom a better example might have been expected, the number of dissidents which the enumerators have had to deal with would have been much less than it is. The staff employed by the statistical committee of the Doncaster board of guardians have just completed their labours, and we find out of 1,678 schedules delivered to the farmers within the union, 1,480 have been filled up by occupiers, 183 by the enumerators. and only 10 left blank. The union question comprises 53 parishes, within a radius of 10 miles round Doncaster, and a population, according to the last census, of 33,655 souls. The extent of the union is 98,982 acres, of which 48,320 acres are under tillage—viz. (in round numbers), wheat, 17,029 acres; barley, 10,061; oats, 2,258; rye, 512; beans and peas, 2,742; vetches, 416; turnips, 10,162; mangold 117; carrots, 8; potatoes, 1,048; flax, 15; other crops, such as cabbages, &c, 333; bare fallow, 3,615. There are 37,917 acres of grass land, including 12,389 acres of clover, lucerne, and other artificial grasses; and 25,528 acres of permanent pasture. The number of acres occupied by houses, gardens, roads, fences, &c., is 1,869; and 383 acres of waste attached to farms. Woods and plantations extend over 6,301 acres; commons belonging to parishes, 1,159 acres; small holdings of less than two acres, 617 acres; and there are 2,415 acres unaccounted for. The numbers of live stock in the union on the 1st of July, 1854, were as follows:—Horses, 3,806; colts, 969; milch cows, 2,879; calves, 2,787; other cattle, including working oxen, 4,065; tups, 728; ewes, 20,044; lambs, 23,290; other sheep, 10,756; swine, 6,735. This return, being the first of its kind in the district to which it refers, has been looked for with considerable interest by the farmers who have supplied the information for it; and they will, of course, now obtain such a view of the producing capabilities of the district as they have had no means whatever of consulting before. It is obvious that an important item is still wanting—namely, the acreage produce of grain, but this is an enquiry too delicate to press at present. The opinion of the farmers of the district in question is, upon the whole, favourable to the project of agricultural statistics, and would be much more so if they were fully assured that their landlords had no means of access to their returns—a security which the temporary machinery employed does not afford, as *ex officio* guardians are generally landlords.

THE MANAGEMENT OF FARM LABOURERS.

The many discussions which have taken place of late on this subject ought to give rise to a little healthy cogitation in more than the columns of the agricultural press. There is probably nothing more desirable than this, if the subject is practically treated. The social, moral, and industrial condition of our labourers has always been an interesting field of inquiry; and from the present imperfect state of the law of settlement, and the prospects of its revisal at no distant date, such a discussion may contribute towards a speedy and satisfactory conclusion. In arguing the question hitherto, we fear parties have too often overlooked the truth of the old proverb, that "As the old cock crows the young one learns." In other words, success in the management of agricultural labourers, and indeed labourers of every kind, can only be obtained by following the example which every good man has endeavoured to practise from time immemorial. The progress of applied science, and the consequent sub-division of society, as well as labour, no doubt, demand corresponding changes in the *modus operandi;* but such only involve matters of mere detail; for the grand essentials on which success depends remain the same. In either case, we must still say, as our forefathers said, and the Romans before them, "*Dignum patellâ operculum*"—[Like master, like man]—example being of equal importance with precept and reward.

For the sake of brevity and perspicuity, servants may be divided into two classes—married and unmarried; and our observations will be confined to the social, moral, and industrial position of each, embracing the three divisions of the kingdom—England, Ireland, and Scotland.

In England, our married servants lived almost exclusively in villages exterior of the farm. The distance they had to travel evening and morning was not great, the village being immediately adjoining; it was, however, such as to prevent them from going home to partake of a family meal. Indeed, the habit of carrying about their victuals with them had so established itself, that the evils attending it, although keenly felt, especially by the more intelligent and better disposed among them, were considered as the peculiar lot of their *caste*, and therefore quietly submitted to by them generally, without a murmur; at the same time they were not insensible to the blessings of breakfasting and dining at home.

There are, however, in England many exceptions from the village system, and our employer had one, a horseman, to whom we gave a house and garden adjoining the homestead, indeed, part of our own house and garden. The effect which this change produced upon the social habits of the poor man was soon manifest; his evening hours, which used to be spent in the gossip of the village, and too frequently in the ale-house, being now spent in the cultivation of his garden. Previously he had neither "a local habitation nor a name," so to speak; but now both, with an anxious desire to maintain them. Although still a weekly servant, he knew that so long as he acted with integrity and uprightness towards his employer no change would be made to the worse; for he saw that the relation which now subsisted between them was not more in favour of the one than the other. The change not only affected the man himself and his family, but also produced a salutary influence upon his fellow-servants, who now saw his interest inseparably associated with that of the farm, and acted towards him accordingly. They now saw him not merely as elevated above the evils with which they were surrounded in the village, but invested with a responsibility which he was bound in duty to perform, and they to respect. They saw, for instance, that he could no longer overlook short time or mistakes of any kind, whether committed by himself or others. In short, they saw that the exception in question very much improved the relation between master and man, and pleaded hard, many of them, to enjoy its blessings.

Horsemen, cattleman, shepherd, and a few others, although weekly servants, had yet regular employment throughout the year; but several had only occasional employment, as in hoeing and harvest, or draining, and such like jobs. A few woodmen had also regular employment, while a few others had not.

Although weekly servants, and now resident upon the farm, they manifested no disposition to shift about from place to place, but the contrary, to remain in our employment as long as they could. This was, no doubt, occasioned partly by circumstances of a peculiar character, our employer being a nobleman of the highest rank; but the farm-servants of the tenantry upon the estate were not more disposed to change than they.

In Ireland, again, many of our married servants were small farmers, the tenants of our employer, the same nobleman whom we served in this country; and those who were not, resided in villages, as in England. They were also weekly servants, a few of whom had regular employment: but, upon the whole, the relation between man and master here is of a very fragile character, and hardly a subject on which we can dwell with either pleasure or profit. This, however, is easily accounted for, from physical circumstances: there were, for instance, three times the number of labourers upon the estate which it required. This enabled large farmers, or rather farmers who employed labourers, to get over their work by times, so as to be free of any superintendence afterwards; consequently, for upwards of half the season they had no work to give. A few of the poor people had looms, and could procure a livelihood from this quarter between hands; but the majority were seriously impressed with the notion that their landlords ought to supply all balances of this kind; hence the low wages, half-work, and other consequences which follow, all affecting less or more the stability of the relation between master and man, and indeed the social fabric altogether.

This was in the province of Ulster, prior to 1845. In the other provinces, part of which we visited in examining some farms for parties in this country who proposed renting them, the social condition of the labouring population was of a far more gloomy character; for they had even less employment, with only half the wages, or sixpence per day, and that miserable pittance generally paid in potatoes! On one farm, which we examined about the middle of winter, there were several men armed with guns, whose duty it was to watch the turnip-fields night and day, to prevent the poor people stealing the turnips for food! With such facts before us, we are by no means surprised at the exodus which has since taken place, and the consequences it is fast producing for the better.

In Scotland our married men had houses and gardens upon the farm, and were engaged from year to year; and those of the tenants of the different farms and estates adjoining were similarly situated. Like their southern neighbours, they were not given to change, generally speaking, some exemplary hands remaining longer in connexion with farms than their employers, who held on long leases of 19 years. One's birthplace always carries with it many endearing associations; and rude as some of these cottages were, as will subsequently be shown, under the last head of our subject—wages—we have seen older people than children shedding tears when removed from the houses in which they and their forefathers were born, into new ones of modern construction. At one time there had been a number of "cottier tacks" upon the farm; but these were abolished long before we saw it. Indeed, this kind of relation was generally done away with about the beginning of the present century, or when improvements in agriculture commenced in the north, along with many small holdings held directly of the landlord.

The exceptions from this rule are on farms immediately adjoining villages or towns where a few hands from these generally find employment at odd jobs; or adjoining waste lands, being reclaimed by small tenants, who occasionally contract for harvest-work, draining, and such like; while in some parts of the highlands and islands of Scotland, the cottier and village systems may yet be seen in all their primitive simplicity.

In England and Ireland there was no difference between the relation of single and married servants—the day's work done, both being allowed to shift for themselves, no regard being paid where or how they lived. There were, no doubt, many exceptions from this plan among the farmers of the district, especially in this country, where numbers of them boarded with their employers; but, generally speaking, they lived with parents or relatives comprised under married servants. Some of them had regular employment; others, not; and neither of them were more subject to change than their parents and married brothers.

In Scotland we had them first boarded in the farm-kitchen; but subsequently were obliged to build a bothy for them. On another farm two of them lived with their parents, one boarded with another family, and two had a house between them—a sister of one occupying one apartment, cooking and washing for them, and receiving employment on the farm for what spare time she had, in hoeing, weeding, harvest and barrow work. They were generally engaged for six months, but sometimes for twelve, and, unlike their married companions, were generally disposed to shift place and look about them—many of them purposely to acquire information, at other times to better their circumstances, and sometimes to get a house, married, and "settled in life" under a good master. Whatever they may be now, they were then (fourteen years ago) a very independent party in a "feeing market," and not much otherwise on the farm; and if they could not make a satisfactory agreement, a difference of five shillings, or even a peck of oatmeal, or the paraphernalia of the bothy or wages, would have sent not a few of them to the railroads, England, Ireland, or America.

As to education, intelligence, and morality, until very recently the Scottish peasantry enjoyed many advantages over those of this and the sister country. The rising generation of the three divisions of the kingdom are probably now nearly upon a level as to mere literary education acquired at school; but it is otherwise with those grown into manhood, and the instruction which they are yet capable of giving their children at home; while the village system hangs upon the necks of parents and children like a millstone, not only preventing the small amount of information which they possess being given, but even undoing what good in reality they have already done. Those who have any experience in our rural villages must be aware of the character which a few “black sheep” give them, and the baneful influence which their example has upon the education and morals of boys and girls. In Scotland, on the contrary, a pious, intelligent, and well-disposed servant endeavours by every means in his power to get “settled in life’ under a pious, intelligent, and well-disposed employer so that his children are not only under his own eye, but those of his master and mistress, whose authority and example are often of greater importance in the bringing up of his children than his own. There is here, then, a practical difference of circumstances sufficient to account for all those characteristics which distinguish one province from another; so that to blame the one for being somewhat behind the other without the necessary qualification is highly unjust.

The plan of giving prizes to the best scholars and students has long been successfully practised both in schools and universities, and therefore may be extended to servants of different ages or classes after they have left school and entered into service. We had several Scotch ploughmen who finished their education in the kitchen or bothy during winter, or in their bed-rooms during summer; some of them becoming tolerably good masters of agricultural science. They were subscribers to circulating libraries, and instead of spending their leisure hours in idle gossip, spent them in reading the various periodicals and publications of the day, thus acquiring a general knowledge of things. Two of them accumulated considerable capital, married farmers' daughters who had a little more, and are now farming successfully on their own account; and other two are bailiffs. Indeed, we have met with numbers of Scotch bailiffs in this country and Ireland who had advanced themselves in the same manner, and English bailiffs in Scotland and Ireland. It is not, however, in farming where the English labourer elevates himself generally, but in the other arts and in gentlemen's establishments, &c. Here we have met several of those who had once served us as farm labourers in this country, pretty comfortable in the north. We may reasonably conclude, therefore, that £20 given in prizes in a district would give rise to a spirit of inquiry among this class, tending greatly to cultivate a degree of intelligence now very much wanted.

Prizes for morality have never been approved of, because of the impossibility of any judge but God pronouncing a just sentence. At the same time, good conduct is not without its reward, in either division of the kingdom. In England, Ireland, and Scotland we always preferred the honest man to the rogue, and even gave from a sixpence to a shilling per week more to the former of wages, in order to secure his services, and from 20s. to 40s. when engaged per annum.

We have always found the selection of pious and active servants one of the most important points in successful agriculture; and when they reside upon the farm, it is tenfold more so. We found it, for instance, of greater importance in Scotland where they resided upon the farm than in England and Ireland, where they were drafted beyond its confines, and the gates locked behind them. If we heard of a ploughman getting into a scrape in the village, we might rebuke him privately next day, and even dismiss him if he persevered in his evil habits; but the law of settlement forbade us to bring a decent man from the adjoining parish, or the poor man whom we had sent about his business to leave his old haunts and the associates of his crimes, and settle in a distant parish where he was unknown, and had an opportunity of reforming. The law of settlement not only prohibits changes of this kind, though productive of the highest moral good, but establishes in the village over which we have no control the very opposite of morality, while it compels us at the same time to support the rogue and his family in the Union!

(To be continued.)

ON THE CULTIVATION OF THE POTATO.

SIR,—Some time in the course of 1853, you will remember I ventured to throw out a few suggestions with regard to the cultivation of the potato crop, and called attention to the great advantages that would result from the employment of mineral manures, and from drying and preparing the seed. I have lately received a great many letters, from different parties, who inform me that they have put the plan to the test of experiment, and are very well satisfied with the results. Herewith I forward to you a few extracts from the most interesting of these communications. I will not offer any comments upon them, as they may be said to speak for themselves. As you will observe, they are in the main highly satisfactory, though they appear to show that in one or two respects my directions might be modified with advantage.—I remain, gentlemen, yours, faithfully, THORNTON J. HERAPATH.

Mansion House, Old Park, Bristol.

I.—“This year, 1854, I planted a large field with potatoes, and manured them according to your directions, with mineral manure. The sets were well dried, and, when planted, the soil was top-dressed with a compost of lime, salt, and soot. The produce was nearly free from disease, and very fine and well tasted, and very different in character from that of the last two or three years. Potatoes cultivated in an adjoining field, and manured with farm-yard manure, were, to some extent, diseased. The roots, when cooked, were not to be compared in flavour to those manured according to your directions.”

II.—“I top-dressed my land with ashes—several tons to the acre. The potatoes before planting were dipped for a short time in a weak solution of blue vitriol. The salt being expensive, I used only about an ounce or two to the gallon. * * * The roots having been allowed to remain for about half-an-hour or so in this liquor, they were planted in the drills, and covered over with earth and ashes. They were manured with lime and salt, mixed together in the proportions you recommend (2 bushels of lime to one of salt), and dung, well rotted. The lime and salt I used at the rate of twenty bushels to the acre. The dung about half the usual quantity. * * * The crop was very fine, the haulm healthy, and the tubers sound and free from disease, and of capital flavour. Some potatoes, manured only with farm-yard dung (the usual quantity), and without ashes, &c., were affected with the disease, though not so much as in former years. The tubers were not so much diseased as the haulm, but turned out somewhat waxy on boiling."

III.—"This year I cultivated my potatoes according to your directions. I exposed the seed for some weeks in a warm atmosphere, and thus well dried them before planting. I manured the land with a mixture of lime, salt, and ashes (sown broad-cast), using two bushels of lime to one of salt, and incorporating nearly twice the quantity of the ashes of our fire-grates, in which we burn both coal and wood. The crop was excellent, both in quality and quantity. A few of the tubers were diseased, but we had more than an average crop, and the roots were infinitely superior in flavour to those I had manured with nitrogenized manure only; that is to say, with the refuse of my pig-sties and stables."

IV.—"All along this coast (North Devon) the farmers are in the habit of mixing large quantities of sea-sand and shell-sand (saturated with salt water) with the soil of their potato fields, and the crops turn out excellent. Sometimes we manure also with farm-yard manure; but, so far as my own experience goes, I think you are quite right in stating that highly nitrogenized manure is not suited to the potato crop. I have generally observed that those fields where most dung is used are always the most diseased. A field this year manured with salt and lime bore an excellent crop, as did also a neighbour's who followed the same plan. * * * The soil was rich, but was manured last year with shell-sand."

V.—"I manured my potatoes with a mineral compost, prepared with wood ashes, salt, lime, and coal-ashes, with some soot. The crop was good, and, I may almost say, entirely free from disease. We have not had much disease in this neighbourhood, but I think my potatoes are infinitely superior in quality to those manured according to the old method, I mean with common farm-yard manure."

VI.—"I cultivated my potatoes this year according to your directions, taken from the *London Journal*. I dried the seed by exposure for several weeks on the floor of a room in our manufactory, and planted them in drills in the usual way, manuring them with mineral compost, prepared by mixing together about 1 cwt. of wood-ashes with a quarter of a hundred weight each of gypsum and bone dust, nearly the same quantity of nitrate of soda, and say another cwt. of salt and lime. In another trial I used only a mixture of road scrapings, well rotted dung, and litter, followed by a pretty heavy top-dressing of lime and salt. * * * The crop was very fine; much better, I may say, than any I ever had before. The potatoes were of excellent quality, and not at all diseased."

VII.—"In my experiments the land was manured, about three weeks or a month before planting, with fifteen or sixteen (I forget which) bushels of salt and lime, with ashes. The potatoes were very carefully dried, and manured with a small quantity of good yard manure, but I employed much less than I heretofore used. The crop was a fine one, and not in the slightest degree diseased."

VIII.—"I adopted your suggestions to a certain extent in the cultivation of the potato. I kept the seed very dry on a boarded floor a month or more before planting, early in March. In the drills I put a small quantity of earth on the seed, then filled up with lime and salt, well mixed together, in your proportions* (two bushels of lime to one of salt); the land was manured in February with earth composed of very rotten dung, quite decomposed, and road dirt. At a proper age they (the potato plants) were well earthed up, and the haulm was of a fine green colour, and showed no symptoms of decay until the second week in August. I have not finished digging; but so far as I have gone, it is the best crop I ever had, in quantity and quality; not more in number decayed than we used to have before the disease originally appeared. If I had applied your remedy in full, I doubt if I should have done better. My men inform me no one in the parish (Westbury) has been so successful."

IX.—"Your opinion with regard to the cultivation of the potato I believe to be a sound one, and is fully borne out by facts in this country detailed to me by Mr. Barter, of Ballinphelick, who last year had a magnificent crop in a lay field, *without any manure, and no blight whatever in it.* This year the same field was manured with farm-yard dung, and the crop very indifferent, and greatly damaged by the blight, excepting an acre manured with sea-sand only. This acre has no blight whatever. * * * Where inorganic manures cannot be had, and the land is too poor to grow a crop without the stimulant of some manure, I should recommend a moderate quantity of dung only, and to be ploughed into the ground early in winter, and in spring the crop to be planted without any manure in the drills.

X.—"This year I planted about five acres in potatoes. The soil was dry, and the land in good condition, and has been in pasture for several years. I manured with salt and lime, in the proportion of about one bushel of the former to two of the latter, and at the rate of perhaps twenty bushels to the acre. In preparing this mineral manure, I dissolved a portion of the salt in water and slacked the lime with it, and then mixed up the powder, and dried it with soot and and coal ashes (well screened) The sets were dried by exposure in a warm place for some time before planting. I had an excellent crop, and shall in future always follow your directions. The potatoes were fine and mealy, and much superior to my neighbours'. * * * I should inform you that I applied the compost to the land some little time before I planted the potatoes."

XI.—"Yesterday, in Queen's-town, Mr. O'Brien, who cultivates potatoes extensively, told me that he had two fields this year, one manured with dung, another with kelp and lime, and the difference was very great indeed in favour of the latter, which escaped with little blight; the other field was very much injured, and of little value."

XII.—"I dipped the roots before planting, in a weak solution of the sulphate of copper, of two or three ounces to the gallon * * * The first part was manured with about forty bushels of ashes (to the acre), pared from the hedge sides and burnt, mixed with more than twice the quantity of cinders (sifted). The second with about half the quantity of the same compost, and with dung. The third with lime and salt, ten or fifteen bushels, and with ashes. The fourth with lime and salt only. The fifth with lime and salt, with a certain proportion of dung The sixth with cinders and dung. The seventh with your mineral compost,* ashes, and yard manure. The last with dung only. * * * The second, third, and sixth were decidedly the best; the potatoes were quite healthy, and quality excellent. The first, fourth, and fifth not quite so good; the tops were somewhat diseased, but the tubers not much to speak of. The seventh was bad, but not so bad as in former years."

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* "I introduced a portion of sifted coal-ashes into the heap with the lime and salt."

* 30 lbs. of wood ashes,
15 „ of calcined bones in fine powder,
10 „ of gypsum.
20 „ of common salt
30 „ of air-slaked lime, and
7 „ of nitrate of soda, well mixed together.

XIII.—"I was present on Saturday at the digging of a sack of potatoes (manured according to your directions), the seed for which was given to me, called 'Flooks.' They were very fine, and only six bad."

XIV.—"Last year two of my friends determined to follow your advice with regard to the culture of their potatoes, and I can assure you they are very well satisfied with the results. Their crops are excellent, indeed they say they never had better; the tubers much larger than ordinary, and of excellent flavour. I should tell you that they dried their seed, by keeping them exposed for some time (for two or three weeks I believe) on the floor of a warm room, dipped them for a little while in a weak solution of sulphate of copper, and then planted them directly in the ground, as you advised. They manured the land first with sea-sand (such as the sailors use for ballast), and then with a mixture of lime and salt and wood ashes."

XV.—"According to promise, this year I followed your advice with respect to my potatoes. I dried the sets as well as I could, by exposing them for about three weeks or a month in in a warm dry room, and then planted them in well-drained land, which I manured with mineral compost of nearly the same composition as that given in your letter, but containing a larger proportion of nitrate of soda; perhaps three times the quantity. I put in more nitrate of soda, because the land was poor and sandy. At the proper age, I earthed the plants up and watched them carefully. The crop is very fine, and not at all diseased. It is larger, I think, than I ever had before. Perhaps it would have been still better if I had used a small proportion of farm-yard menure. What is your opinion?"

XVI.—"The results of the experiments I undertook at your suggestion, are as follows:—I divided the land into a dozen different plots of nearly equal size. The first of these, which I will call No. 1, I manured with salt and lime only—two bushels of the latter to one of the former, about twenty bushels to the acre. No. 2 plot I top-dressed with salt and lime, mixed with soot. No. 3 I manured with farm-yard manure, first giving it a top-dressing of salt and lime. No. 4 was prepared with a compost of 30 wood-ashes, 15 bone dust, 10 gypsum, 20 common salt, 30 air-slacked lime, and 7 nitrate of soda. No 5 was prepared in the same way, but was also treated with dung. In all these, the tubers were first dried by exposing them on the boards in a warm room for some time before planting. Nos. 6, 7, 8, 9, 10, and 11 plots were manured in exactly the same manner, but the tubers were prepared by first immersing them for a longer or shorter period of time, in sulphate of copper of various strengths, and then planting them as before. In plot No. 12, the potatoes were treated in the ordinary mode, that is to say, were manured with farm-yard manure only. * * * My results may be thus briefly stated:—In No. 12 the potatoes were diseased both tuber and haulm, and did not keep well or turn out well in cooking Those, on the contrary, that were manured with the mineral compost, and with the compost and yard-manure, were excellent (Nos. 2, 3, and 5, I think, were the best); a few were diseased, but I never tasted better or more mealy potatoes. In the case of the other plots—I mean those in which the roots were first steeped—I think the best crop was obtained from the one in which the tubers were steeped for only about an hour in a solution of about one ounce to the gallon of water. In the others, the plants, I thought, were not so strong and healthy. Whether this was owing to the dry weather we had several weeks about the time of planting, I cannot say; but I think you will find a weak solution of about this strength will give the best results. Neither do I think it necessary or advantageous to keep them in the copper solution longer than half an hour, or an hour. In fact, merely dipping them into it will, I think, answer quite as well, and save time. I intend to try this method next year."

LIQUID AND SOLID MANURING.

Sir,—When last addressing you on the subject of liquid manuring, in Essex and Ayeshire, I had to complain that due attention was not being paid to the facts of the case, so as to establish the practice upon a solid foundation; and what has since transpired fully justify what I then said; for it now appears that Mr. Telfer's success depends not so much upon liquid manure as solid (25 cwts. of guano), quoting from his invaluable letter in "The Journal of the Royal Agricultural Society of Ireland." No guano, "3 tons 10 cwt." grass for instance; small dose "37 tons 6 cwt. 1 qr. 24 lbs.;" while "25 cwt." gives "77 tons grass;" *the practice, you will perceive, resolving itself into that of Chandler's liquid manure drill*—a very different one from liquid fermentation in an open tank. Of the efficacy of Chandler's practice in a dry summer like the last and on a porous soil, few of the readers of the *Mark Lane Express* will be disposed to raise a doubt; but we are yet far from being sufficiently informed of the details of Mr. Telfer's practice to be able to say whether he or Mr. Chandler economises the ammonia the most successfully. Then follow the peculiarities of the season; the temperature and rain gauge, for instance, with the degrees of moistness, or hygrometrical state of the soil, so as to get at that degree productive of the greatest vegetation. If Mr. Telfer will put us in possession of the necessary facts of this kind involved, he would be conferring a lasting benefit upon agriculture; and, in the hopes that he will do so, we shall drop Italian rye-grass culture for a time, and notice some of the characteristics of solid and liquid manuring generally. It is possible, nay probable, that Spooner's principle of applying solids and liquids separately, as subsequently noticed, may supersede both of the above plans—fermentation in an open tank, and the mixture of guano, &c. with water immediately before being applied to the soil, because it adapts itself to wet seasons and climates as well as to dry, economising at the same time the ammonia equally, if not more successfully. Under this plan, pipes and hydrants on many farms may be dispensed with, there being running streams sufficient to supply water in abundance for artificial rain, which may easily be applied by a portable engine, with pumping apparatus attached and hose, the guano being applied with drills or broadcast manure distributors. But of this more afterwards in detail.

The subject of solid and liquid manures has from time immemorial engaged more than an ordinary share of attention, and with our increasing millions it must continue to do so. In the manufacture of the former there is now a large capital invested, with the prospect of its being greatly increased, whatever some may say to the contrary; while the many successful experiments being made with the latter, are bidding fair to secure for it an equal chance of patronage.

Liquid manure drills, again, have given rise to an intermediate theory, as it were: those manufactured according to Spooner's patent having the solids and liquids applied separately but at the same time, each having a place for itself in the machine, and special apparatus for its own distribution, the two being thus mixed together in the soil; while in Chandler's exactly the same theory is involved, the two being mixed in the application by the machine.

The enthusiasm with which new theories are so frequently introduced, coupled with the short-lived popularity of so many of them, with not a few failures altogether, has necessarily given rise to caution on the part of practical men, and, it may be, in some cases groundless misapprehensions; but, weighing both sides of the question, their conduct is more deserving of praise than reprehension, generally speaking; for the facts of the case, when maturely considered, fully justify the cautious manner in which solid manure theories and liquid manure theories are now being embraced and reduced to practice. It is an easy matter for farmers, for instance, to throw money into the soil, but not such an easy matter to take it out again. They require to take more than a superficial view of things before parting with hard cash for either new manures or machinery, although fully aware at the same time that both must be had. At the present moment they are fully aware that improved machinery, management, and manures are absolutely necessary to successful husbandry; but although satisfied as to this, the practical question remains to be solved, viz:—Are the propositions recommended to their notice the identical ones they should adopt?—a question which can only be solved by experiment, and where more than the testimony of one season is required to afford a satisfactory and trustworthy solution. Moreover, after they have examined the experiments of others, how few of them are applicable to their own individual cases—soil, climate, pecuniary and other circumstances duly considered! Hence the peculiar position of a practical man.

Soil, season, climate, and crops, conjunctly and severally, exercise a very important influence upon our subject. Different soils, for instance, require different kinds of manures, whether solid or liquid; and the same may be said of crops; while solid manures are best adapted for wet seasons and climates, and liquid manures for dry. If the soil, again, is not only different, but season and climate also, there must consequently be a corresponding diversity in crops, manures, and management.

Local circumstances, again, may be equally influential with diversity of soil and climate. In some cases, for instance, farmers are so situated as to be under the necessity almost of growing certain kinds of crops, whether they are the best adapted for their farms or not, as in the neighbourhood of large towns, where dairy and garden produce are in such request as to cover extra expenses in the management, which otherwise could not be complied with, while the command of specific manures and food for cows and other live stock, extraneous of the farm, exercises a corresponding effect.

Looking at the vegetable kingdom again, we find that something like ninety per cent. of the elements of plants in the early stage of life is water, so that it forms by far the most important portion of their food. The familiar and beautiful expression of the sacred poet—"*The heavens drop fatness*"—is thus literally true. Accustomed to estimate the nature of things according to the price we pay for them, we set little value upon spring and summer showers, because they cost us nothing; nevertheless, summer clouds are more valuable to farmers than the Lobos Islands, with all their fertilizing treasure. It would be useless to waste time in arguing the question, for a month's dry weather is enough to afford a practical demonstration of it.

There can be no such thing, then, strictly speaking, as a solid manure theory. A farmer, it is true, may apply guano, or any other of our artificial manures, and often does so successfully, if the clouds drop fatness at the same time, or the soil contains a sufficiency of moisture for its solution; but otherwise his labours are lost, for in dry seasons such manures do harm rather than good, until showers fall. Hence the value of the liquid-manure drill, in dry weather, for starting root-crops; for when once they are fairly into the "rough leaf," from the action of their leaves and roots, with the decomposition of the manure, they almost supply themselves with a sufficiency of moisture, if the atmosphere is not all the drier. The action of the roots and decomposition of the manure are perhaps more particularly observable in cases where the manure has been dibbled in, than when sown broadcast or in rows. If, under such circumstances, it is examined about the time of hoeing turnips, it will be found to contain a percentage of water even greater than the roots interwoven in a mass through it by this time do, although the soil around is almost perfectly dry. This is probably more true in cases where bones are used, than with any other artificial manures.

On the other hand, the propriety of applying water in any form or manner in rainy weather may justly be queried; for the grand object of art is to supply the imperfections and wants of nature, so that where nature gives an abundance, sometimes to overflowing, for art to add more, is worse than useless. This will appear manifest from the injury crops sustain in wet seasons, so that for art to make every season so is obviously bad practice. In some provinces, for instance, the climate is too moist for the successful culture of wheat, or even barley. Sometimes drought is no doubt experienced, and frequently more severely than in drier localities; but generally the reverse is true. In the exceptional cases, we have seen barley and turnips sown three times on tenacious clays, the soil being fresh ploughed or loosened every time. If a heavy shower of rain falls immediately after sowing, succeeded by drought, such soils bake, and must be loosened between the wet and dry, to secure a crop; and ploughing is not unfrequently necessary to effect this, followed by harrowing, clod-crushing, scarifying, &c., &c., so as to leave them in a sufficiently porous state to admit of the free circulation of air. This loosening of the soil is not merely to break and permeate it for the admission of air, and extension of the roots in search of food, but also to get rid of an excess of water in the working, and to procure a supply from night dews, when a deficiency is experienced afterwards by the increasing demand of plants. Now, to add water by artificial means in the former case, would obviously be superfluous; and it would be equally so in the case of porous soils already charged with an excess of water, for any additional supply by art would then either percolate through them into the subsoil, or be removed by drains, carrying along with it some of the more valuable elements of manure held in solution, as we shall afterwards prove.

Again, air, light, and heat are as essential to the health of plants as water and guano or other solid manure, and excesses and deficiencies of supply are no more injurious in the latter case than the former. Now, in many elevated districts, especially of the north, there is generally a deficiency of heat, however well the land may be drained and cultivated, accompanied with an excess of rain, which increases the evil by means of evaporation; consequently to increase the supply of water by artificial means would be making the matter still worse. In such cases, Nature supplies a sufficiency of liquid manure, generally speaking; indeed, the exceptions are few in which she does not; but she gives a deficiency of heat. Hence the province of art is to make good the balance here wanting; and the only means at command is efficient drainage and culture, so as to reduce evaporation to a minimum, fermentation of manure in the soil to produce heat, and shelter so as to screen exposed fields from blasting winds. On the other hand, every province exhibits too many examples where improper culture excludes the necessary supply of fresh air, not only to the roots, but the plants above ground from weeds, an excess of flag or thick-sowing; while porous soils are left too open, and sometimes thinly seeded, and hence are soon scorched. In these cases the obvious remedy is better management, with a more judicious selection of manure to avoid flag, with the concretion and puffing of soils, as much as possible.

Such being the peculiar and somewhat anomalous position of manures—solid, liquid, and aërial—how is the practical man to proceed with new-fangled theories which of necessity must be adopted in some form or other, under the varied circumstances in which we find him? To adopt one mode of procedure only, would obviously be false; but, before attempting to answer the question by modifications of new-fangled propositions, let us first take a retrospective glance at the manures and practices of former times, which so many prefer to follow; for although they are insufficient to meet the peculiar demands of the present age, they yet involve important principles, fully tested by experience, and, what is more perhaps, exhibit at the same time their respective shortcomings. The old maxim, "To find out the seat of the disease is to effect half the cure," comes here into operation, so to speak; for to supply the shortcomings of Nature and present practices is all that science can achieve in the manuring of the soil.

Well-made farm-yard manure, then, contains from 75 to 85 per cent. of water, *so that a considerable amount of its salts are in a liquid form*, and every successful turnip-grower knows that no small part of the art lies in getting it into the ground with this sap, retaining at the same time the natural moisture of the ground itself. If the soil is allowed to get dry, it will imbibe the moisture of the manure, and prevent its farther decomposition and incorporation with it, and a similar result will be experienced if it is too wet. It is only the mean between these two extremes that can attend success, and the necessary per-centage of water required by the soil and manure to produce the greatest effect is much less, we aver, than the doctrines of some liquid-manure theorists would lead us to suppose. It is one of those plain matter-of-fact questions with which every practical man is familiar, though scientific investigation is rather wanting on the topic.

A medium of heat and air, as well as moisture, is also necessary to effect the decomposition of farm-yard manure, and its incorporation successfully with the soil—a fact which proves the soundness of our former remarks. In this case, the extreme of fire-fanging is as bad as that of frost, if not worse; and too porous a soil, or improperly covered manure, exposing it to the influence of the atmosphere, as when it is ploughed in too deep, or where the ground is too wet, poaching and placing it as it were in an hermetrically-sealed vessel, from which the oxygen of the atmosphere is exclued, is always experienced as equally injurious. Indeed, there is nothing more injurious to crops than cold weather, especially if accompanied with rain. In this case the cold not merely arrests vegetation, but the decomposition of the manure, and hence the supply of food, so that plants suffer equally from cold and hunger as it were. Every winter season furnishes an apt illustration of this, when vegetable life remains in a passive state, and manure lies unchanged, turning up out of turnip drills in spring as fresh almost in rainy seasons as when covered in. In wet weather the rain not only removes heat by evaporation, washing from the soil soluble manures, but it also fills up the pores of the soil, thus excluding the admission of air, and hence the decomposition of the manure, and incorporation of that portion of it not consumed by the first crop with the soil, for the wants of subsequent ones. With these things practical men have long been familiar, and they are equally aware of the necessity of the soil being in a proper state of disintegration, or reduced to a sufficiently fine mould to secure an abundant harvest, and absorb the gaseous matter given off in the process of decomposition, or from the roots of plants, or from subsequent chemical changes which these may undergo along with the mineral elements of the soil itself, and the whole manurial residuum which it contains. Experience, for instance, has taught them that if the land poaches during the covering of the manure the consequences are unfavourable, and that it does not require a very heavy shower to make some kinds of soil poach; and the finer and more favourable the mould for turnip-growing, the more easily is this accomplished. Prior to the age of furrow-draining, subsoil-ploughing, and rotary-forking, we have had not a very tenacious clayey loam reduced to the finest mould for turnips—part of the field sown, part being manured, in the most promising state, and the remainder ready for drilling—but the whole work, although thus progressing rapidly and favourably, brought to a premature conclusion by a single thunder-shower, neither very heavy nor of long duration. For some time after the storm a horse-hoof could not enter the field without doing harm. The portion sown was so consolidated as to check alike the action of the manure as the progress of vegetation, while the remainder could not be reduced again to a proper mould, being literally a mass of clods like road-metal; so that in the former the manure received too little air and heat, and in the latter too much of both—each division suffering for the want of moisture during the dry weather which succeeded. B.

(To be continued.)

DRAINAGE OF LONDON.

Though London still remains without any organized system of drainage, and though over a considerable part of its area the common facilities of sewerage are almost, if not altogether, wanting, we think we may nevertheless congratulate our metropolitan readers on the point at which this question, after years of agitation and debate, has at length arrived. In a few words, the Commissioners of Sewers are now at last upon the right track, are apparently in earnest, and are so far advanced in the business that action must needs soon take the place of argument. Four or five years ago all the leading principles on this subject had yet to be established. It was not so much as confessed even that a new organisation of metropolitan sewerage was necessary; on the contrary, it was argued in official quarters that all we wanted was an extension, and perhaps a little improvement, of the system actually in use. It was not acknowledged that the Thames ought to be included in the area to be purified. Some engineers declared that such a purification of its waters was impossible; others roundly asserted that the attempt would be an entire mistake, for that the river could never serve any better purposes than those of a sewer, for which it was eminently and obviously fitted. Pending all these discussions of principles there were endless discussions of detail, the metropolitan public got confused and disgusted with interminable squabbles over pipes and "sumps," and, in the end, as everybody will remember, one commission after another was swept away without any substantial results having been obtained.

The present aspect of affairs, if not absolutely satisfactory, is considerably more promising. The principles of the question are settled. All the points for which, on behalf of the public, we so long contended are now admitted by all parties together. There is no longer a question about the propriety of purifying the Thames; every scheme recognises this condition as plainly indispensable. There is no longer any dispute about the radical reform of the whole drainage system; every scheme proceeds directly on this assumption, and recommends itself exactly in proportion as it professes to introduce some new, effectual, and comprehensive arrangements. Channels of some kind or other are to be substituted for the bed of the Thames; into these main tunnels the sewers of the different districts are to discharge themselves, while every house, instead of standing, as many now do, over smothered cesspools, is to have an outlet for its drainage into the sewers. These are the great points of the question now accepted. The sewage is not to accumulate in cesspools or "sumps," nor to be poured into the stream of a tidal river, to be washed backwards and forwards at our feet; it is to be carried away through some artificial channels to some spot where it will at least be innocuous, and where, as our knowledge of these matters improves, it may some day be converted into a marketable commodity.

Another satisfactory circumstance is, that besides these advances in theory, considerable advance has been made in practice. It is not only acknowledged that all this ought to be done, but it is confessed that it can be done. A scientific and comprehensive drainage scheme, which not so very long ago was pronounced a thing utterly impracticable, is now admitted to be easily within the means of our engineers, and is not expected, after all, to cost any very formidable sum. Measurements have been taken, plans devised, and even formal estimates framed and presented. The approaches, as military engineers would say, are all complete, the parallels have been finished one after another, and the breaching batteries are at the very walls of the place. We scarcely see how there can be any further pretext for suspense or delay. The project of draining the metropolis on a comprehensive and effectual system is not only known to be practicable, but more than one set of men are ready at this minute to set about the work. The Metropolitan Commissioners of Sewers have nothing to do but decide definitively between the proposals before them; and this, as our recent reports have informed the reader, is what they are now about.

Without prejudging the several questions which have already been propounded, and which will shortly come before the public afresh, we may give our readers some general view of the points for discussion. There is one question as to the level at which the main tunnel sewers ought to be carried; there is a second as to the scale on which they ought to be constructed; and there is, of course, a third, as to the particular course which they should take. The second of these points is that which appears to have created the principal debate, and on its solution will depend much not only of the character but the cost of the scheme adopted. The smaller the main sewer is, the more easily and cheaply it can, of course, be made; but the difficulty here is this—that, whereas a comparatively small drain would perfectly suffice to carry off all the ordinary sewage, a much greater power of discharge is required to deal with the excessive flow produced by heavy rain-falls, and the dimensions of the sewer have consequently to be calculated for these extraordinary occasions. The designs of Messrs. Bazalgette and Haywood, the engineers, respectively, of the Metropolitan and the City Commission of Sewers, adopt what may be termed the broad gauge principle in these matters; and their views are confirmed by the authority of Sir W. Cubitt and Mr. R. Stephenson, who are decidedly of opinion that smaller dimensions than those approved in the said designs would end in nothing but disappointment. Altogether, this seems to be the principle most in favour in official quarters, while the proposals of private and independent projectors point to simpler and less expensive plans of operation.

Our readers will easily discern that, although much interest must naturally attach to these discussions, the points of chief importance will in any case be secured. We shall obtain an unpolluted river and a scientific system of sewerage; but it is not to be forgotten that even these advantages will lose much of their value, unless the drainage of particular dwellings is placed upon a better footing. It is clearly of no use to have a good tunnel sewer, unless the house-drains of all districts are made to avail themselves of the outfall. At present we not only have no satisfactory outfall, but many dwellings have no communication even with the sewers which actually exist. At the Court of the Commission, held on Tuesday last, the Chairman observed that the number of houses "drained into sewers"—that is, brought for the first time into connexion with the sewers of the district—was at the rate of about 20,000 every year, of which cases as many as 7,000 were the result of compulsion. Very many houses, however, including, as Sir J. Shelley observed, "some of the best in Grosvenor-square, have still cesspools under them; and as long as such a practice is maintained, it will be of little avail to provide general facilities for the escape of district sewage. It is of no use purifying either street or river, if the very dwellings in which we reside are kept impure. Without the main drainage scheme we cannot possibly have good local drainage; but unless local drainage is also reformed, the advantages of the new system will be lost. Both warnings and examples are now before us. Pestilence has but just departed from our doors, and we cannot tell at what moment it may return. Amid all the mystery attending its ravages, this alone seems clear, that in proportion as wretchedness and dirt are superseded by cleanliness and comfort the plague is disarmed of its terrors. We are now blessed with a respite and an opportunity; let us turn them to such account for all classes of people as becomes reasonable beings and Christian men.—The Times.

LIQUID MANURE.

Sir,—The following notes of a lecture, given by Mr. Wilkins at the London Tavern on Thursday evening, may be interesting to some of your readers, the subject being—The application of liquid manure to the roots of plants.

Mr. Mechi (who presided), in introducing the lecturer, stated that he had, with two or three other gentlemen, seen some experiments at Reading, the result of which was most extraordinary. Mr. Wilkins had there taken some very poor land, near the station, and divided it into a series of double beds, for various kinds of produce, one bed being treated by Mr. Wilkins's process, and the other adjacent to it by the ordinary method; in every instance the produce of the former largely exceeded that of the latter, the seed being sown in both beds at the same time, and from the same parcel. It was a matter of calculation whether the produce would give a sufficiently large return to justify so great an outlay; but he thought that if the cost of paving, &c., were even £100 per acre, it was a question whether the increased crop would not return an ample interest on the outlay, and a large profit. All the crops on the beds at Reading treated according to Mr. Wilkins's process exhibited extreme freshness and luxuriance, and especially, in the case of the mangold wurzel and carrots, great freedom from fangs. The practical application of the sewage of our towns to the land by means of pumps and pipes, as he distributed liquid manure at Tiptree Hall, was a subject deserving great attention. Prof. Way had estimated the value of the sewage of London at two millions sterling; it would be a very great result if it could be disposed of even for one million. The water companies pump up and convey a ton of water several miles for about a penny; and if it can pay to bring the water for London from Hampton, it would, he thought, be quite as economical to pump out the sewage of London to the waste lands and heaths in the neighbourhood, and, by making sterile land productive, largely increase the food of the population. By applying manure as a top-dressing, the surface was to a certain extent caked or hardened; but in Mr. Wilkins's system the top soil remained uncaked, and absorbed freely the rays of the sun.

Mr. Wilkins commenced by stating that by his improved system of agriculture Russia would be superseded in the growth of hemp and flax, and England would be independent of all nations for the necessaries of life: that two crops, nay, three crops, and for cattle seven crops, annually might be produced.

In the year 1853 the lecturer took a piece of waste land at Wokingham, adjacent to Mr. Walter's property, which he laid out and planted with flax and hemp, according to his own method, as follows:—The upper soil being removed, a paved floor of brick was constructed, at about 18 inches from the surface, round which was placed brick on edge 4½ inches high, forming a raised rim round the entire plot, the whole being made perfectly water-tight; semicircular tiles with open joints were placed longitudinally on this floor, having their convex side upwards, and communicating at one end with a vertical pipe, to receive the liquid manure, and at the other with a plug, by raising which the quantity of sewage-water in the bed could be reduced or entirely drained off; there was also another pipe by which could be observed the height at which the fluid stood in the bed. The rows of drain-pipes were laid parallel to each other, their distance apart being regulated by the width between the rows of seeds about to be sown.

The top soil was then replaced to a level with the surface, and the flax and hemp sown in rows exactly over the line of drain-pipes; the liquid manure was applied down the pipe once or twice a week, allowed to stand a short time in the bed, and then drained off. The first crop of hemp was sown in the middle of April, and the second crop, from new seed, three months after, on the same ground; both crops were about 6 feet long. Specimens of these were produced, as also of the two crops of flax grown on the same land.

Mr. Wilkins considered that the application of liquid manure to the root of a plant was the true principle of Nature; that the tip of the root was the mouth of the plant, the leaves were its lungs, and that, in order to render that plant luxuriant, its food must be supplied to its mouth, and not to its lungs. He did this by his method, the liquid being drawn up by capillary attraction and evaporation, to the roots.

The lecturer then exhibited some specimens of potatoes, mangel-wurzel, Indian corn, beetroot, Italian rye-grass, and lucerne, produced on the experimental garden at Reading, laid out on the principle as before described. The rent paid by him for this piece of ground (seven acres and a small cottage) was £2 per annum. The plants in each double bed were sown on the same day from the same seed. These beds were each 100 feet square, those on the new principle receiving about two feeds of liquid manure weekly, and no manure being applied to the adjacent one. The result of the experiment was that on the beds cultivated on his system the potatoes were double the weight of those on the unprepared piece, being taken up in eleven weeks. The mangel-wurzel was produced at the rate of about 69 tons per acre, the average weight of the roots being 12 pounds each, whereas on the unprepared piece it was 4 pounds, and on a piece of ground prepared with a top dressing of liquid manure, 6 pounds. The Italian rye-grass was cut five times on the prepared bed to one cut on the other; the fifth of the former being exceedingly tender and juicy, while the one of the latter was tough and dry. The lucerne also gave three cuts on the new system to one on the old. The Indian corn came to a good-sized ear on one piece; but no corn ripened on the other. The wheat and swede crop did not succeed, owing, as Mr. Wilkins supposes, to bad seed. The white turnips were sown on Sept. 2nd—on one bed turnips of a large size were produced; on the other, the seeds never vegetated. After the potatoes were taken up on the prepared bed, winter broccoli was sown, and in six weeks was ready for table. This was followed by Savoy cabbages, fit to cut last month, or three crops produced between May and December. A cattle-cabbage was grown, weighing 12 pounds; its stump was allowed to remain on the ground, and it had now on it 15 young cabbages. In June he had planted a small potato, picked up at Wokingham, of a kind which but seldom arrives at a large size; this was taken up early in September, in the presence of Mr. Mechi, when the haulm was found to be five feet long, and the produce of the root 17 potatoes; having a total weight of 8½ pounds, one potato alone weighing two pounds.

An ash-leafed kidney, planted in sand, on the top of a house, in eleven weeks produced 84 potatoes.

The results of feeding cows on the rye-grass produced, was that one cow gave seven quarts of milk when fed on the grass from the bed on the new system, but only six quarts when fed on that from the other. The lecturer had no doubt that the cream and butter would be largely increased. It was mentioned that the application of sewer water to the roots of some geraniums had caused them to be in perpetual bloom, and suggestions were thrown out for the application of this principle to conservatories and sitting-rooms.

Mr. Wilkins estimated that the cost, according to his present construction, with bricks or tiles, would be about £100 per acre; but he believed, by forming the water-tight bottom of gas tar and sand, that the expense would be reduced to about £50 per acre. Even at the larger cost, on the very worst land, he was certain a very large profit would accrue, and that, by the employment of his principle, England might become independent of all nations for the necessaries of life.

I think that this method is peculiarly applicable to cottage gardens, where it will no doubt largely increase the crop; but it appears to me that the difficulties in carrying it out on a large scale will be very great, though I do not say they may not be overcome by talent and energy.

If executed in a series of small beds, the cost of distribution would be excessive. This is a point upon which Mr. Wilkins has not entered, and which would be insignificant in an experiment on a small scale. If, on the other hand, the beds or reservoirs are constructed of large area, the ordinary drainage of the land will not be so efficiently carried on; it would be difficult to keep the reservoir perfectly water-tight; and in undulating ground the sewer water would not be retained in the reservoir, but drain off over the lower edge.

I therefore do not think that the construction adopted by Mr. Wilkins will be likely to succeed, though I am of opinion that the system may, in time, be brought into profitable use on a large scale, by some modification of the present draining tiles and mode of laying them, so as to combine in one operation the two objects of surface-drainage and underground application of liquid manure.

I hope before the end of another year we may have this and other information connected therewith, and thus be enabled to come to a conclusive decision on this important subject.

H. P. STEPHENSON.

London, 37, *Charing-cross*, *Jan.* 15*th*, 1855.

GUANO *v.* PROTECTION.—Mr. Hope, an East Lothian farmer of some note, is stated to have said, in "the Transactions of the Highland and Agricultural Society," that "it is to the invaluable aid of guano that the farmers of the United Kingdom are mainly indebted for having been successfully carried through a transition state of doubt and difficulty, the approach of which few regarded without alarm, as it was not unfelt even by those who had strongly advocated the propriety of the change." The prosperity which the farmers have lately enjoyed in this country, as well as on the continent—the large consumption of guano in the Mauritius, the West Indies, and the United States, will all tend to increase the demand for this valuable manure, which has now become a great staple commodity, and gives employment to over 200,000 tons of British shipping annually. The sunless lands of Great Britain, the rice fields of Italy, the wine lands of Germany, the exhausted coffee plantations of Brazil, and the arid plains of Peru, all testify to its fertilising properties. In 1851, 6,550 tons of guano were supplied to farmers from Leith; in 1852, 8,000 tons; in 1853, 13,500—showing an increase in the consumption there, as compared with 1851, of fully 100 per cent. Last year, we believe, nearly 50 per cent. increase was shown. In the Clyde, in December, there was a stock of nearly 4,000 tons ready for spring orders. It thus becomes a matter of great importance to the agricultural community—nay, we may go further, and say, to the community at large—that sufficient supplies of guano be directed to our shores, at or under the current prices of the last four years; and although there is a general outcry in Liverpool, and some other quarters, against the monopoly in Peruvian guano, we have reason to believe that the farmers of the Lothians, and Scotland generally, are satisfied with the mode in which the business is at present conducted. The dealers buy cargoes from Messrs. Gibbs, and it is supplied to the farmers direct from the import ships, whereby they are always safe against adulteration or inferior quality. Prices, however, are now fully £2 per ton higher than last year; the price for Peruvian being at £11 to £12, whilst in January, 1854, it could be had at £9 5s. per ton.

AGRICULTURAL CHEMISTRY AND MECHANICS.

In going through the Patent Office lately with Bennet Woodcroft, Esq., our attention was more particularly arrested by two things—*First, The importance of this branch of Government to Agriculture*, and, *second*, the labours of Her Majesty's Commissioner to effect a thorough reformation in it as far as the means within his power will enable him to do so, bringing the chemical and mechanical ingenuity of all ages and nations to the assistance of the British farmer. The two are kindred subjects, mutually interesting it will be perceived; both of them very comprehensive—too much so for discussion in one article; and therefore we shall treat them separately in two, in the order just given under the above title or heading.

The Patent Office may not unaptly be termed the fountain of chemistry and mechanics, for it is through it that progress in those sciences is first obtained. No doubt many successful discoveries have been made, and reduced to practice without being patented; but when we look at the reason why, viz., the expenses of the Patent Office, and antiquated circumstances experienced there—the unanimous admission that inventors have an inherent right in property of this description, and to remuneration for the same—and that the arguments of those who advocate no patent laws, and act accordingly, resolve themselves into the most plebeian of all Democratic governments, where " those fare best who have the longest teeth"—the objection can have little weight with the readers of the *Mark Lane Express*. Moreover, it rather belongs to the next division of our subject, *the reformation going on at the Patent Office*, so that we shall briefly dispose of it when we come to that head. Meantime, suffice it to say, that property of this kind must be under the control of some department of government, and we have no doubt Mr. Woodcroft will prove the Patent Office the correct one, and that all inventions may be easily controlled here.

The value of chemical and mechanical inventions applicable to agriculture may be estimated by the increase of produce, and saving of labour and expense, which they effect. If, for instance, we estimate the effect of patent manure hitherto discovered at an increase of produce of £2 per acre over and above its own cost, then the result would be an annual profit to the nation of £80,000,000, supposing such manure to be fully applied to all soils. The expense of manual labour and horse-power, again, will considerably exceed this sum annually; and the very important question of how much of it can be saved by improved machinery and steam power is now engaging the serious inquiry of the Patent Office, as well as the agricultural public. And, besides this saving on manual and horse labour, improved machinery and steam are now being brought to bear upon the drainage and culture of the soil; so that results therefrom may greatly exceed in value those of either, or even both, of the former improvements.

But although we may thus estimate the value of inventions retrospectively viewed, we cannot calculate, even by the most distant approximation, what chemical and mechanical discoveries may prospectively produce; and this is the most important view of the subject—that which more particularly belongs to the province of the Patent Office, and which is but too commonly overlooked, if not set at nought altogether, by the public.

This latter misfortune of overlooking what may yet be obtained, of reasoning and acting as if Invention had already reached her last stage in the march of progress, is a very serious one, and probably experienced more injuriously in agriculture than any of the other arts; and the opposite extreme, of not embracing the improvements of *to-day* in the expectation of getting better to-morrow, is equally ruinous to the farmer.

In practice, this latter extreme is but too often a mere pretext to cover poverty, ignorance of the value of new things, or an over-attachment to old modes of using them; but with the growing intelligence of our rural districts under a better system of education, and rights of capital invested in land and its cultivation, such will soon disappear, although hitherto the provinces themselves bear ample evidence to the soundness of the above, and results consequently experienced.

The proposition, therefore, of the Patent Office, as involving its duties to agriculture, may be thus briefly defined: *to bring the greatest amount of chemistry and mechanics to bear upon the soil and its produce;* and the obvious duty of agriculture is to respond to the labours of the Patent Office—propositions too obvious to require proof.

Reciprocity of action, however, although thus simple in theory, is otherwise in practice, from the many stubborn circumstances of the soil which both patentees and farmers have to overcome. Let us take the sewage-matter of towns and steam-plough as examples for illustration.

In the former case, how many flattering propositions has the Patent Office enunciated as to the manufacture of the sewage matter of towns into a portable manure, easily applied to the soil, and capable of increasing its produce so as to render the country entirely independent of foreign corn! And yet the fact is notorious that not only has this not been realized, but that the farther inventors have proceeded in their efforts to overcome the difficulties in the way, the more insurmountable they appear! So that many farmers are now beginning to despair of ever receiving portable manure of any value from this source, and to turn their attention to the application of sewage in its natural or liquid form to their hungry lands.

On the other hand, inventors, who have any practical knowledge of chemistry, mechanics, and farming, readily perceive that the difficulties in the way of any successful and paying liquid sewage system is as great, if not greater, than those in the way of its manufacture and application in a portable form. Hence the prospects which the Patent Office holds out for new discoveries, supported by the premiums offered by enterprizing individuals, such as Mr. Brooks, of Manchester, who, in defiance of the scepticism and prejudices thrown in his way, laudably points the pioneering genius of the inventor to a source of manurial wealth without its parallel in the world.

In the latter case, the progress of the steam-plough is more uniform; the obstacles in the way being mechanical, appearing more easily overcome at every advance which is made.

There cannot be a doubt, therefore, that the Patent Office will ultimately triumph over all the difficulties in the way, in both these cases—in the former as well as the latter; and that it would accomplish this sooner if its laws were farther revised, placing them upon a footing in accordance with the grand object they have in view; in other words, were chemistry and mechanics cultivated as the other sciences are (?); for we know several inventors who are anxious to enter both fields (sewage-manure and steam-plough), *were the public, or its representative the Patent Office, honestly to give them credit for their inventions (?) without calling upon them to pay a triple fine for this discharge of public duty !!* but who cannot, for conscience' sake, enter into patent-office speculation, or pay away hard-earned money without first receiving value for it.

A practical question arises out of what has just been said, of some value—viz , the point at which farmers should embrace progressive improvements; and the obvious answer is, that whenever they become paying concerns, they should then do so.

In the reduction of this rule to practice, it is a common mistake on the part of inventors to set too high a value upon their productions, both intrinsically and commercially, thus preventing their general adoption by over-estimates of this kind, until something more favourable has appeared in the field, to supersede them: while another error is to place their inventions in the hands of companies, in the hopes that by such means they can force the public to embrace them. The consequences of such a course are almost too manifest to admit of recital. The "Manchester Sewage Guano Company" may be taken as an illustration, where the expenses of management and manufacture exceeded the value of the manure! Now in this case there cannot be a doubt that too high an estimate was formed of the value of the manure, and too little attention paid to the economy of the raw materials, both as to price and quality (we allude here principally to peat charcoal); for if the manure was worth "25s. per ton," we can have no hesitation in saying that the Patent Office will yet succeed in making it at the money with a fair profit. If "25s. per ton" (we repeat) is the agricultural value of "sewage guano," the problem which the inventor, or any one who adopts his proposition, has got to solve is to manufacture it at the money with a profit; and as they are afterwards able to increase its intrinsic value, so to increase its price.

The fact of many farmers having allowed themselves to be imposed upon by all sorts of trash, has no doubt been in some measure the cause of leading not a few manure manufacturers and patentees to the conclusion that such were in reality yielding a profit; and it is even possible that injurious substances of little money value, when applied to some soils, may stimulate them for a time so as to yield an extra crop, and thus give rise to erroneous conclusions on both sides; but as farmers and patentees become more and more acquainted with the chemistry of manure and soils, and the wants of the vegetable kingdom, consequences of this kind will be avoided.

In these observations we must not be understood as advocating the manufacture of useless manures; but while we carefully avoid this whirlpool, let us also with equal anxiety shun the opposite rock of only using Peruvian guano, when one-tenth of the demands of the soil cannot be supplied from this source, for such is obviously to raise the price so as to leave no profit, and, what is worse, *starve the soil.* The sound practice of the farmer is to use as much of both as he can with a profit; and of the manure manufacturer, to call to his aid all the chemical and mechanical assistance he can procure, so as to enable him to sell his products at the lowest possible price, never dreaming, in the present state of science, that by the adoption of this or that patentee's proposals, or a combination of them, he has attained to a fortune-making business in the short period of a patent, for large profits are incompatible with an inferior article; while immense fortunes are sometimes made on things very low in quality, merely by selling at a small price and profit where the demand and consumption are great. Now, in the case of the soil, the demand and consumption of manure may be said to be unlimited; while in the United Kingdom the raw materials of artificial manures are equally so. Hence the wide field of promise for invention, industry, and capital; for if artificial manures were manufactured at a sufficiently low price to call into action this unlimited consumption of the soil, fortunes might be made from small profits, while the opposite must remain the result of the present extravagant charges.

What we have just said of manures is equally applicable, in principle, to machinery; for long before newly-invented machines are brought to comparative perfection, it will sometimes pay the farmer to use them. The reaping machine may be taken to illustrate this. How many are there, for instance, who have waited, and are waiting, for a more perfect machine of this kind! while others, by the use of either Bell's, M'Cormick's, or Hussey's, have cleared their cost ten times over. In this respect there is certainly a wide difference between the foresight, economy, and profits of farmers not very easily reconciled, but yet maintaining with fidelity the truth of the old Roman proverb, "Rusticus expectat dum defluat amnis, at ille labitur et labetur." Even where machines have attained to comparative perfection, as our prize ploughs, portable and fixed engines and thrashing machines, seed and manure drills, &c., &c., how many are there who still use the rude things of the last century! Such, in a word, is the mechanical state of the provinces, generally speaking, that if the statistics of implements, machinery, and modes of using them were laid before our readers, we question very much if half the truth would be credited. We are not denying that progress is being made in agricultural mechanics; quite the contrary, for many are keeping pace with the times, embracing every improvement as soon as introduced, while, generally speaking, an anxiety is beginning to be manifested among the agricultural public to benefit by the assistance of improved machinery of every kind, as has been done in the other branches of industry; but confining ourselves to the past, *how many are there who have never yet once thought that the Patent Office had anything to do with successful farming*, but who have all their lifetime acted on the contrary, neither reciprocating with patentees, chemical nor mechanical, as if their rule was to finish each century with the implements they began it! In the manufacturing world, how differently has it been! for there, spinning-wheels, reels, looms, &c., have repeatedly been consigned to the lumber-room, or sold for what old iron would bring, *for no other reason than to enable their owners to make fortunes!* How often, on the contrary, have our provinces been turned nearly upside down about corn laws, malt tax, and tenant right! while in which of them has a similar movement been made in favour of a reformation of the Patent Laws? and yet is the fact not notorious that they are equally, if not more, interested in the latter than the former? for the former, strictly speaking, are only commercial questions, while the latter embraces the whole field of successful husbandry, as we have already shown. But if such has been the apathy of agriculture for the past to its best interests and only aid in need (progress in chemistry and mechanics), we hope it will not be so for the future.

PROFITS OF POULTRY KEEPING.

We noticed some time since the manner in which a gentleman who occupies a leading position amongst the magistracy of this county, was bringing to the test by careful management, and the keeping of a correct financial account, the profits that may be made from poultry. His purpose was not the breeding of prize birds for a show-day, often, perhaps, done at a considerable pecuniary loss, but to illustrate how this too-much neglected branch of rural economy might be improved and extended, to the gain of the farmer, if more general attention were paid to it. We have now the following letter, containing the balance sheet for the year, with an explanatory statement, and we publish them, believing they will be read with interest at the fire-side of the farm-house.

Cost of food and rearing, January 1*st to December* 31*st*, 1854.

FOWLS OF ALL SIZES, AVERAGE 60.

	£	s.	d.
Food—being barley (in grain) barleymeal, oatmeal, grits, lettuce leaves, swede turnips, rice and milk, and liver; all as occasion required, and without stint	11	2	6
Paid for care and rearing them	2	9	0
	13	11	6
Balance	5	6	3
	18	17	9

Produce for the year, January 1*st to December* 31*st*, 1854.

FOWLS OF ALL SIZES, AVERAGE 60.

		£	s.	d.
Dorkings' eggs	593			
Cochin ditto	700			
At 1d. each	1293	5	7	9
Pullets killed	62			
Pullets, ready for table	28			
At 3s. each	90	13	10	0
		£18	17	9

N.B.—All the pullets weighed 3 lbs., plucked and trussed for the table.

This account should be attended with some observations, so that it may be understood. In the first place the cost of food only may be taken at say £12 for the year; making the calculation more easy, viz., £1 per month; not exorbitant for the keep of 60 birds, and considering the excessive price of barley 4s. 6d. and 5s. per bushel, all the time, and everything in proportion. This, then, gives 4d. as the cost per fowl, great and small; thus, the keep of a pullet 5 months, when they are large enough to kill, would average 1s. 8d. per fowl, bird for bird.

Then if the farmer or cottager bred them himself, the £2 9s. paid others for care and rearing makes the balance £7 15s. 3d. The mixture in the breed between Cochin and Dorking, which for distinction sake I have called "Codors," has improved both in "flavour" and "form" for the table.

The account of the excellence of the pure Cochin, given in Richardson's "Domestic Fowls," page 69, is perfectly true. Some people are pleased to say that the flesh is *yellow* because the skin and legs incline to that colour; but, in fact, it is of purest white; it might as well be said (poetice) the *veal* of black calf would be *black*, or of the milk of a black cow.

As to the eggs, there is *no* month in the year when the Cochins did *not* lay; in November and December last, the Dorkings laid no eggs, but the ten breeding Cochins, in those months, laid 76 eggs.

The sole object of the present experiment was to try what might be done, by cultivating these two sorts as a matter of *useful* economy, not to breed monsters; the medium size in animals is really the best, as in fruit, as every *good* gardener knows. My object was usefulness, and, on the whole, I am well satisfied.

To conclude, I verily believe that the ordinary breeders of fowls, even for the market, fail by *starving* them; in the above statement I hesitated at nothing, every article of food was dear, and I fed them without stint. Hoping this result may be of use, I shall be obliged by your making it public.—Chelmsford Chronicle.

DESTRUCTION OF WOOD PIGEONS.

For several years the farmers of East Lothian have been much annoyed by the injury caused by wood pigeons—their depredations being most felt upon the Swedish turnip after it comes into rough leaf, continuing up till the bulbs are stored. The clover plant in the early stages, during the first winter, also suffers seriously, from the head of the stems being eaten by the pigeons. They are also greedy consumers of corn, and, from their strong pinions, they can beat out with great facility the grains of growing wheat, when it is partially lodged, so as to admit of them picking up the grain thus thrashed out. They do comparatively very little injury to sown wheats, as, unlike other vermin which annoy the farmer, they do not scratch the soil. The wood pigeon is in his habits very shy; hence the difficulty of destroying it. They also increase rapidly, from producing two to three broods in a season.

That farmers occasionally suffer great loss from the depredations of wood pigeons cannot be doubted; but it is obvious that the crow, the pheasant, and some other vermin, usually protected either by landowners or by statute, are equally entitled to be brought under the ban of the agricultural public. It is perhaps not generally known that the wood pigeon is the only one of the pigeon family which is not protected—the pigeons kept in dovecots being recognised by statutes. The crow, although not protected by statute, is protected from there being a general feeling in their favour, thus preventing the public from destroying them in their rookeries during the breeding season. This desire to protect rookeries among landowners is in many cases due to a superstitious feeling. A belief exists that the fall of more than one ancient family has been heralded by the "hoarse croaking" of the dark host, or by their deserting of the mansion. We know of no county where farmers suffer more from crows than East Lothian. On Monday night we had occasion to pass through a portion of that county; and towards evening, the flight of crows which passed over us to one of the rookeries reminded us of Audubon's description of the pigeon-flights in North America. We calculated that, if each individual crow represented one bushel of wheat and one cwt. of potatoes, they would consume and destroy as much of these as the whole *genus* man residing within that county.

We cannot conceive, therefore, why the tenantry of East-Lothian should have singled out for extirpation the only bird which is not directly protected, by law or otherwise; and while approving of their movement, so far as the wood pigeon is concerned, we would suggest that they should strike at the root of the whole system, viz., the rookeries and game laws. That wood pigeons have increased over the whole of the kingdom to a very great extent is doubtless true; but this has arisen mainly from the protection afforded to game by the destruction of their natural enemies, the eagles, hawks, owls, &c., and by the terror instilled into the mind of every schoolboy as to the entering of plantations in search of nests. Thus, during the breeding season wood pigeons are undisturbed, they choosing low trees and bushes for their nests, also plentifully furnished in ordinary preserves. The wood pigeon is also, probably, a migratory bird; and it is believed by some ornithologists that when severe storms occur in Norway and Sweden they flock to our shores, and some recognise that the true Norwegian wood pigeon is rather smaller in size, with also one or two slight variations in marking from the British species. If this can be proved, of which we have little doubt, as we have noticed the difference ourselves in flights during severe weather in East Lothian, the Association should extend their action not only to other counties, but perhaps across the German Ocean! The Association also employs gamekeepers, thus virtually sanctioning the continuance of the system by which the wood pigeons and other pests of the farm have been so increased as to become a nuisance, and one beyond the control of parties directly interested in their destruction.—North British Agriculturist.

LEICESTER SHEEP.

Having read in your journal of the 29th November last, an article headed "Scotch Breeders of Leicesters in a Fix," and noticed a letter in reply from Mr. Grey of Dilston, I beg, with all respect to Mr. Grey, to state that I entertain different views of what are considered to be sheep of the pure Leicester breed. I have for a number of years possessed a small flock of Leicester ewes, and paid some attention to the selection of well-bred rams, and having attended the Highland Society's Shows at Berwick, at which I happened not to be a competitor, but in justice to a few of the exhibitors, I feel inclined to say, in common with many breeders, that the awards given on that occasion to Leicester sheep were not so satisfactory as I could have wished or expected. I never understood that a Leicester ram, with short black-and-white ears, gray and dun legs, was an indication of the pure or original breed, handed down from Bakewell and the Collings, but, on the contrary, have considered the following properties characteristic of the pure breed—A long narrow head, with strong legs, perfectly white and free of wool, long muzzle, full eyes, long white ears, and neck of moderate length, but robust, wide and deep in the chest, shoulders full and broad on the top, round in the ribs, broad across the loins with level back, long between the hock and rump, and straight from the top of the shoulders to the rump, very full in the thighs, with tail falling perpendicular to the ground, and carcase well clad with wool moderately open. It therefore appears to me to be a step in the wrong direction to introduce by purchase or hire rams from their "native country," such as the prize animals at Berwick; as, if these observations are sound, which, permit me to add, are supported by farmers of long standing and admitted ability, we shall have in a few years an inferior breed to many of those stately sheep shown at Berwick, which were allowed to possess no small share of merit, but, unfortunately, were not considered to belong to the class of pure Leicesters. With regard to the premiums at Berwick for sheep, I have yet to learn of any inconsistency in the course pursued by the committee of the Highland Society, as I find upon referring to the prize sheet that Mr. Grey is in error when he asserted that no distinction of breeds is made by that Society—observing that four premiums, amounting to thirty pounds sterling, were offered for sheep of the long-woolled breed, which, I conceive, comprises Lincoln, Cotswold, and Gloucester, and thus clearly pointing out the duty of the judges. WM. MILLER.

Oldhamstocks Mains, Jan. 3, 1855.

CAVALRY HORSES.

BY CECIL.

After forty years of uninterrupted peace, it is not surprising that many of the munitions of war should be found in an unprepared condition. The delightful enjoyments of tranquillity have lulled to rest many of those energetic engagements in which a nation ought to be at all times employed. The sports of the field must be recognised as objects of considerable moment: their good effects are prominently conspicuous; they have served to engross the attention, and to keep in bodily exercise many of our gallant officers who have led their brave men to seek glory and honour at the cannon's mouth; they have also had an excellent effect by encouraging persons to the speculation of breeding horses, without which the supplies would have been most wofully insufficient.

Although we may hope to enjoy a cessation of hostilities, yet the lesson which we have received cannot fail to act as a caution, and, let the war with Russia terminate when it may, the necessity for some powerful stimulus to breeding horses, such as will be adapted either for the future emergencies of war or other purposes of national utility, must still be imperative. "*Si vis pacem, para bellum*," is a motto which should be enrolled on the banners of our government, and should maintain a prominent place in the hearts of the people.

It has been for several years evident to persons who have had practical opportunities of making correct observations, that breeding horses calculated for the general purposes of the country, and especially those which are adapted for military service, has been, to a very considerable extent, abandoned. The growing ardour for racing has prompted the breeding of thoroughbred stock to an unprecedented degree, and it is a pursuit worthy the most gracious patronage. The enthusiastic excitement of the chase, creating a demand for hunters, has induced the most liberal and enterprising of the agriculturists to meet that demand to a certain extent, but still inadequate. The cultivators of the soil are careful men, not willing to involve themselves in speculations which only present equivocal means of satisfactory remuneration. With railways traced over the face of the country in every direction, they naturally concluded that the employment of horses would be very considerably diminished; under an apprehension that they would not be required, the medium class; such as were in former days worked in stage coaches, as posters, and which are equally adapted for the cavalry, has been totally neglected. Their attention has been directed to the production of the other extreme of the equine tribe, the slow, heavy, lumbering, inactive cart-horse, to which they have been encouraged by the agricultural societies. The railways, while they engross an immense proportion of traffic, by the facilities which they afford of locomotion, have increased the amount of travelling to an extraordinary degree, and, therefore, horses are required in great numbers, to collect and circulate the passengers. That the supply of horses should be inadequate to the demand, can occasion no surprise.

The agricultural societies have been unremitting in their exertions to promote improvement in the respective breeds of cattle, sheep, pigs, and poultry, also horses adapted for the use of the farm, but, with very few exceptions, the roadster classes—as useful animals are termed in their categories—have been disregarded; a mistaken policy, no doubt, for which it is difficult to assign a motive. The regulation price allowed by government for troop horses has been too low to induce persons to breed horses specifically for that purpose; ranging from twenty-five to forty guineas would afford no profit. It has recently been raised, and from forty to sixty guineas are now given for animals of equivalent worth. A vast and important impulse would be afforded if Government would take it into consideration, and offer premiums to breeders of horses for animals which are adapted to the service; and if liberally distributed at several of the most important of the agricultural meetings, when they are held during the summer, in various parts of England, could not fail to be advantageous. A premium of fifty guineas for the best horse exhibited, calculated for the ranks of the Life Guards; another of thirty guineas, for the best horse calculated for the artillery or dragoon regiments; and another of twenty guineas, for the best horse adapted for the service of the light dragoons, would be powerful inducements to farmers to devote their best energies to the speculation. It would be necessary to include a proviso, that any horse entered for competition should be subject to the claim of Government at the regulation price of the class for which he is adapted; and the eligibility of the horse for the class in which his owner proposes to enter to be determined by the Government inspector, giving the owner the option of withdrawing from competition in the event of his not approving the class which may be assigned to his horse. This would not only prove a powerful stimulus to breeders to produce horses suitable to the military service, but it would be productive of vast benefit to the country, inasmuch as it would promote the breeding of highly useful horses. It would also be the means of assembling together a vast number of horses, and save considerable expense to officers of regiments and agents in attending fairs for the purpose of collecting the required numbers—a saving which would, in all probability, be equivalent to the amount of the premiums. The arrangements for statistical accounts of agricultural produce not being completed, it is difficult to form a correct estimate of the number of horses which are bred annually in England. In the year 1850, the number of horses used for riding and drawing carriages, according to the returns of assessed taxes amounted to 166,460. If that number be raised to 200,000, for the purposes of including horses which might have evaded the duty, and those for which exemptions were claimed, it appears to be about the numerical force of the country, exclusive of cart-horses and others under four years old. Calculating that horses are not generally put to work until they are four years old, and, consequently, that they are not entered as liable to the duty till that period, and assuming, on the average, that they continue at work ten years, the annual produce will be 20,000, to breed which requires about 80,000 mares. To increase materially the number of horses which are bred yearly must be a work of time. Of the 200,000 one-half the number will be mares; and if one in twenty were to be added to the number of brood mares, already devoted to that purpose, it would only give an augmentation of 5000, which would not produce more than 8,636 foals, and, according to reports, more than that number have already been lost at the Crimea. The statistical returns for Ireland furnish an account of the gross number of horses, including those used for agriculture; therefore we cannot derive any satisfactory information respecting the classes now under consideration, but from the increase of the number under one year old, compared with those between one and two years old, evidence is given that our Hibernian brethren are devoting their attention to the important undertaking. Their horses upwards of two years old amount to 447,543; one year old and upwards, 39,097; under one year old, 53,145.

Breeders of all kinds of stock are unanimous in the opinion that it is necessary to have a distinct class acknowledged to be thorough-bred, to perpetuate the species, whether it be determined to preserve the pure strain, or to mix it with other breeds, and in the latter case it is found to succeed best when the male is of the highest class. To produce the better kinds of horses, the sire must be chosen from the racing stable. The mare may be of a less aristocratic family, providing she possesses power, activity, and symmetry. It has been a misfortune for many that have entered into the speculation, that they have selected horses coarsely bred, and coarsely formed. They too frequently fall into errors in their estimation of those proportions which indicate power; they suffer themselves to be deluded by the appearance of fat as a substitute for muscular development, and they allow excessive bulk rudely to take precedence of activity. One of the principal mistakes of the present age has been the enhanced value set upon horses of great size. There is a standard of excellence which governs the size of all animals; those most essentially which are required for labour. It is often remarked that "a good big horse is superior to a good little one." In theory it appears to be a just conclusion, but practice inquires "where the good big one is to be met with?" There is likewise something more than power requisite to complete a good horse; that is, the will to give effect to the power. This excellent faculty is derived from the nervous excitability of the brain and nervous system, which influences the muscles of locomotion; and when this property exists extensively, unless it be counterbalanced by some physical inability, ill health, or want of sufficient nutriment, the animal will possess equivalent good qualities. This is one of the essential distinctions between the race-horse and the cart-horse; and as it is an inheritance of the former, it affords an important reason why that class should be selected to cross with mares of inferior lineage. When attempts are made to breed horses between thorough-bred ones and those appertaining to the cart, the result is generally attended with disappointment. There are exceptions, no doubt, but they are very rare, and to continue to breed from two animals of the latter kind involves a great risk. It is a well-known fact that horses do not necessarily partake of the nature and qualifications of their parents, but they may resemble a grandsire or grandam, or one of still more remote ancestry. It is from the injudicious selection of sires, and that more frequently than in the choice of mares, that many persons, from the ill-success that has attended such practices, have relinquished the pursuit of breeding. It is not sufficient for the horse and mare to possess the good qualities which are required in their offspring, but they must come of a family possessing those good qualities. In this respect breeders of racing stock have an unequivocal advantage over breeders of inferior kinds; the former can obtain, from indubitable authority, the perfections and imperfections throughout several generations. When the relative proportions of horses and mares are studied, it will be found that the horse is naturally of greater size; it is, therefore, by no means desirable to seek for mares of the largest frame. Nature is an excellent monitor on such occasions, and does not suffer her ordinations to be transgressed with impunity. An oversized mare is very uncertain in her produce; one year she will give birth to a puny, weak, leggy foal, and the succeeding one will, in all probability, be too bulky, inactive, and clumsy.

Suggestions have been made, in divers quarters, that, to improve and perpetuate the breed of riding and cavalry horses, Arabian and half-bred sires should be introduced, urging that our thorough-bred horses originated from Arabian or other Oriental blood. An inquiry into the rise and progress of our racing stock will confute such an absurdity; for absurdity it is, to assume that the powerful, high-couraged English race-horse is to be displaced by an animal scarcely removed above his primitive condition. Respecting half-bred sires, enough has been already urged against them.

This is, in truth, an age prolific with mechanical genius, a most important and valuable talent; yet, while all sorts of devices have been proposed to render the mechanical inventions of war successful, the most effectual means of bringing them into operation, through the agency of the horse, has been totally forgotten.—Sunday Times.

REVIEW.

DALTON'S METEOROLOGIST.

Published by Joseph Thomson, Market-street, Manchester.

This is a Meteorological or Weather-Table, arranged by Mr. Bennet Woodcroft, of her Majesty's Patent Office, from tables formed by the late Dr. Dalton, of Manchester, and other data extending over twenty years, exhibiting at one view the mean monthly state of the rain-gauge, the barometer, and thermometer at that place; as also the time of sunrise, with the mean monthly temperature and annual mean height of the thermometer in the Crimea. The profit derived from the sale of the print to be appropriated to the Patriotic Fund.

It forms one of a series of the most interesting, useful, and ornamental productions to the agriculturist which we have seen; and, from its cheapness (only one shilling), cannot fail of finding a place beside every barometer. To the farmer the weather is ever a source of anxious inquiry, engaging his first attention every morning, and his last at night. During seed-time and harvest, how often does he visit his "weather-glass!" And the beautiful table before us, indicating the mean monthly averages, would enable him at a glance to arrive at satisfactory conclusions. Others are being arranged for the capital and different metropolitan towns, and, like this, have only to be seen to be duly appreciated and purchased for the highly instructive purpose for which they are so admirably fitted.

To give our readers a faint idea of this invaluable production of art, and the fresh obligations they lie under to Mr. Woodcroft in spending his leisure hours for their good, we may mention that a column is appropriated to each month of the year, commencing with January on the left, and ending with December on the right; four other columns, two on each side, comprising drawings of a thermometer, scale of rain-gauge, hours of the day, and barometer. On the extreme left, for instance, there is, first, a graduated thermometer, and between that and the column for January the rain-gauge. On the extreme right, again, is the barometer, with the scale of the twenty-four hours of the day between it and December: the twelve hours A.M. being at the top, and twelve hours P.M. below. The monthly mean averages are indicated by four bright-coloured vertical lines in each column; and the annual mean height of the thermometer and barometer by dotted cross-lines. A red line, for instance, indicates the monthly mean height of the thermometer, and a yellow that of the barometer. Blue lines, again, show the mean quantity of rain for each month: while a green line shows the mean monthly temperature of the Crimea, as the red does that of Manchester. A semi-orb in each monthly column opposite the hour-index shows the time of sunrise at the middle of each month. And the different indices are so plain, simple, and conspicuous, that a child may read them. The following are those for January, tabularly stated :—

SUNRISE 8h. 2m.	deg.
Red line (thermometer) Manchester	36.7
Green line (thermometer) Crimea	32.00
	inches.
Yellow line (barometer) Manchester	29.80
Blue line (rain-gauge)	2.257

The border, again, is elegantly and tastefully ornamented by chromo-lithography, in gold, red, and blue, expanding at the top into shells and scrolls, in which is placed a medallion in the centre, containing a portrait of Dr. Dalton, with four female figures, two on each side of the Manchester philosopher, typical of the four seasons; while at the bottom of each monthly column is a corresponding figure emblematical of the month's meteorological character, by the operations of the field, in which they are respectively engaged. A sower, for instance, under March, represents seed time; a reaper, under August, harvest; a woodman, under January, blowing on his fingers before commencing the labours of the day, conveys to the mind a very faithful picture of the present month; while the other nine figures are equally expressive: the whole, put together, communicating an amount of information which we should not now like to want. Three things demand special notice: the disinterested manner in which Mr. Woodcroft commemorates the invaluable labours of Dr. Dalton; supports the Patriotic Fund; and confers upon the public—especially the agricultural interest—a lasting benefit at the same time.

THE TRADE OF 1854.

The past year has proved that any attempt to measure our prosperity by the value of the goods we export is a great fallacy; and it proves that no amount of goods exported can compensate for the diminution of our domestic exchanges. Messrs. Littledale and Co., of Liverpool, state in their annual circular that "The result of the past year's business, so far as commerce is concerned, is most unsatisfactory, both for *Imports* and *Exports*; and so generally will this fact be admitted by those engaged in it, that any lengthened digest seems almost needless."

This is the language of one of the largest commercial firms in the first commercial town in the kingdom. Of *cotton*, they affirm that "every bale has lost money." "*Sugar* has lost money from whatever quarter imported." Of *tea*, "bad, and made worse by its unsound condition." The only articles which form a set-off against this gloomy side of the picture are rum, tallow, hemp, grain, rice, flour, linseed, and such articles as are affected by the war and high prices.

It must not, however, be imagined that there are no complaints to be made against the merchants and manufacturers themselves. To a certain extent they are the originators of evils which are certain to recoil upon themselves. It has been frequently remarked to us by manufacturers, that money capital is no advantage to a man in business, while he who possesses none has equal facilities for carrying it on, owing to the irregularity of the system of credits. But this seems to be owing to that want of a sound system of credit which has been practised in the manufacturing districts; and until this is terminated by some generally acknowledged plan, those who practise it will continue to carry on their operations until a pressure in the money market brings them down; it is then that the cautious and the improvident fall together, dragging down every one connected with them.

The following remarks from the circular of Messrs. Littledale and Co., although more particularly applicable to the cotton trade, may be applied with equal truth to other branches of our commercial enterprise. In referring to the unsatisfactory results of trade during the year just closed, they add:

"But it may be fairly asked, How can this be with exports exceeding any previous year on record? Who can be found to go on sending goods to this enormous extent, if they are losing money in nearly every market in the world? and what is the secret of their loss? It seems to originate, in a great degree, in the manufacturers themselves becoming the large exporters they now are; and the ramifications of evil arising from this practice are most momentous, and well deserving the attention of the manufacturer himself. In the first place, it deprives the regular export merchant of his legitimate profit, by bringing into the same market as his missions a larger quantity of goods than the markets can fairly take, and these latter being generally sent under advance, are forced off at prices which entail loss on both parties—then comes the competition for returns, the large sales force down the rate of exchange, and produce is bought in preference, at prices which entail a second loss on importing."

The same authority, having noticed the commercial error committed, refers to another point of equal importance, but which seems to be almost wholly neglected by the manufacturing and mercantile part of the community:

"The manufacturer's purpose, for the moment, appears to be answered, as, by shipping off his surplus make, he obtains a better price for what he sells at home; but does he not thereby give an undue support to the price of the raw material, which must tell against himself both as a manufacturer and an exporter? Then see the money part of the business: when discounts are at 2½ or 3 per cent., he can draw at 6 months, with a renewal at 4 or 6 months, thereby giving ample time for the goods to be sold at leisure; but with money at 3 per cent. and upwards, he draws at 3 months and renews at 3 months, the orders sent out, being, as stated in a letter received from Calcutta by a late mail, 'to realise on arrival without reference to price, and to remit in produce whatever may be its cost.'"

When will the great manufacturing and mercantile interests read such lessons as these to their profit? When will they learn that *dear money* reduces their credit from 12 to 6 months? When will they see that our monetary system tosses them about like a balance in the hands of an Indian juggler? If British merchants wish for stability and security in their transactions, they must carry on their business upon a more rational system, and learn to discover the *causes* of such failures as have characterised the Trade of 1854.—Bankers' Circular.

ANNUAL REPORT OF THE LINSEED TRADE.

SIR,—The termination of an eventful year again affords us the pleasure of furnishing you with our annual retrospect of prices, &c. They possess unusual interest this time, from the critical state our trade has been placed in during the past twelve months; for the war unhappily existing between this country and Russia (and having its chief seat in the district usually supplying the largest quantity of linseed), renders it of paramount importance to gather as much information as possible, not only of what *has been* passing here, but the effect likewise of the so-long-expected closing of the Black Sea trade, *should it ever occur.*

LINSEED, although a larger importation than last year, so far as this port is concerned, will nevertheless be found materially shorter in the aggregate (probably one-fourth, and the deficiency all arising since August); the sources of supply also again much altered since our last statement was published. Of the 249,450 qrs. imported, the East Indies furnished 117,500 qrs.; the Black Sea and Mediterranean (the latter being chiefly transhipments of Black Sea seed), 93,000 qrs.; Alexandria, 6,000 qrs.; Archangel, 9,500 qrs.; and the Prussing Baltic ports and sundries, 23,500 qrs. Of this no less than 70,000 qrs. were re-exported *all within the last four months.* The ports of Riga and Petersburg, which last season shipped half a million of quarters, are this year blank, but from Memel a larger quantity than usual has found its way, some of it being of the description ordinarily sent through Riga. At Archangel 53,000 qrs. were shipped—14,500 qrs. to United Kingdom and 38,500 qrs. to Holland and Belgium, &c. The total supply from the East Indies exceeded 280,000 qrs. From Alexandria about 25,000 qrs., and from the Azov and Black Seas the unprecedented quantity of 700,000 qrs, of which 575,000 qrs. have already arrived, and been divided as follows:—Hull, 210,000 qrs.; London, 93,000; Grimsby, 30,000; Southampton, 26,000; Yarmouth, 22,000; Ipswich, 10,000; Lowestoft, 7,000; Liverpool, 7,000; Newcastle, 4,000; Lynn, 3,500; Leith, 3,000; Dover, 2,700; Gainsborough, 2,000; Gloucester, 2,000; Dublin, 1,500; Boston, 800. For various Belgian ports, 100,500 qrs.; Holland, 40,000; and France, 10,000.

The total imports since 1849 have been as under, namely:—In 1849, 626,495 qrs.; 1850, 608,986 qrs.; 1851, 630,471 qrs.; 1852, 796,561 qrs.; 1853, 1,035,336 qrs.; and 1854, about 750,000 qrs.; during the crushing season, say from 1st July to the 30th June following, the result showed thus;—1848-49, 700,000 qrs.; 1849-50, 600,000 qrs.; 1850-51 and 1851-52, 700,000 qrs.; 1852-53, 825,000; and 1853-54, 1,030,000. We estimate 1854-55 will be about 700,000 qrs.

Our market had scarcely opened last year, when an immediate rise of full 10 per cent. occurred; Black Sea seed, which was quoted 58s. on the 1st January, selling at 60s. before the middle of that month; a slight reaction followed, through speculative realization of the handsome profits then obtainable; but although a forced sale was made as low as 57s., the market continued in a most healthy state, and 60s. was soon again re-established as the current price. Seed was by no means plentiful during spring months, and when, early in March, it became certain war would be declared, the price ran rapidly up to 64s., and during the last week of that month to 70s. The supplies after this period were much more liberal than had been previously expected, and particularly from Odessa, where the prohibition of the export of wheat had caused a run upon seed to fill up vessels chartered for England, and thus save any claims for dead freight, &c. A decline of about 2s. per quarter took place in April—parcels for arrival offering at even 2s. less money. By the end of May, the value had receded to 63s. and about this date some very large contracts (which we notice more particularly in a subsequent paragraph), were entered into by the Greek houses for the shipment of Azov seed, conditional on the ports remaining open, and no governmental impediments intervening. Prices declined steadily after this time, marking 62s. in June and July, 61s. down to 58s. by end of August, and 56s. 6d. and one forced sale at 55s. before the end of September. Large conditional sales making, all through this period, of Black Sea seed, at about the rates current on the spot; the continued uncertainty as to when the blockade would really be made effective keeping the trade in a most perplexed and unsatisfactory position. In October, many causes combined to produce a great reaction in prices; the continental crushers, shut out of their usual Baltic supply, appeared as buyers here. The demand for oil for export exceeded anything we ever remember, and the same might also be said of the home trade for cakes; by the end of the month, therefore, the price had recovered to 64s. on the spot, with eager buyers at 65s. to 66s. for distant deliveries. This season our crushers profited by the experience of *several* former years, and did not leave the continental buyers to clear our market of *all* the cheap seed; on the contrary, the purchases for those markets have often been after a rise here, so that a large proportion of the cheapest seed has been left for home consumption. In November, the reiterated assurance of an *immediate* blockade, and a continued extraordinary demand for seed for export, further improved the value to 69s., and extensive purchases also were made of floating cargoes at 70s.

Last month, the market was hardly so strong, for large shipments of the *new crop* were known to be taking place in the Black Sea, and crushers having now less anxiety as to their wants for remainder of this season, wisely abstained from following up the market at these extreme rates.

There is not much to remark as regards quality. The Archangel seed arrived very rough, and out of condition. Less care seems to be taken with the Calcutta sorts; for they come more mixed than formerly. The quantity from Bombay is greatly on the increase, and quality satisfactory. Marianople, Berdianski, and Glubok seed have commanded a great preference amongst Black Sea descriptions; but the bulk of the Azov seed has been indifferent this year, and much of it arrived in a very heated state. As regards the late harvests, we are at present without any reliable information.

In granary, in merchants' hands, there are 13,000 qrs. of Black Sea, 3,000 qrs. Alexandria, 2,000 qrs. Petersburg, 5,000 qrs. Memel, 4,000 qrs. Archangel, 8,000 qrs. East India and sundries; together 35,000 qrs. The quantity floating is large, namely, 125,000 qrs. Black Sea, 110,000 qrs. Calcutta, 10,000 qrs. Alexandria and Mediterranean, and 5,000 qrs. Memel; in all 250,000 qrs. Nearly the whole, however, is sold, and much of it is for transhipment to the continent.

In May last, notwithstanding the extreme rates at which contracts were made for Azov seed, our English crushers took that opportunity to buy freely, being most anxious about the future, and only too glad to secure some portion of seed to keep their mills at work in the autumn; they of course relied in fullest confidence on the positive statement of the First Lord of the Admiralty, that a blockade of *all* Russian Ports had been ordered to take place after a certain date. This official assurance having been given in the most unqualified terms, large operations were entered into, eventually entailing a serious loss to the buyers, and for which our own Government was entirely to blame. So far as the interests of the consumers of linseed were concerned, there can be no doubt they have been benefited by the trade continuing open; but the complaint of the manufacturer is, *not that no blockade exists*, but that he should have been so *deceived* through being informed by those in authority, they were not to expect anything further from Russia. This naturally induced him to send his orders to our own possessions in India, whence large supplies have since come forward at a great loss, having to compete with the continuous import of seed from the Black Sea. If the Government had stated that the blockade was contingent on certain events, it would then have been a fair matter of speculation for the parties interested; but with such unhesitating and clear answers to the many communications addressed, in the first instance, to it, merchants have great reason to complain of the course pursued by the Government. The pecuniary loss was in many instances very heavy; but this was less than the disappointment of those who had operated in full dependence upon the word of an English Ministry, and especially, also, when they remembered that their loss found its way into Russian pockets. The vaunted stoppage of Russian trade is altogether a myth, in as far as the South of that empire is concerned; with the exception of the articles prohibited by the Emperor himself, it has, in fact, been even greater than in previous years.

If we could but place unreserved faith (even now) in the renewed assurances of our own Government, and especially in the late caution published by the Admiralty to the trading community relative to a blockade of *all* the Russian ports (should hostilities continue on the re-opening of next year's navigation), we have really only the East Indies to depend upon for next year's wants. Doubtless high rates will greatly stimulate the production there (already more than double that of 1853), and ultimately tend to make us independent of Russia altogether for the article of Linseed; but the increase there could only be gradual, and for some years will go but a short way to compensate the deficiency of the million to a million and a-half of quarters which that country has hitherto supplied various European ports with. Even if peace quickly ensued out of the reported present negotiations, the interruptions to the regular channels of production in the south must render our supply for 1855-56 a very precarious one. We cannot express any opinion as to the future; everything depends on the course political events take. We fear peace is far distant, and in no case is the end of the present season likely to find us with a surplus stock. The continent has still great wants, and must come to our markets to supply them. The reduction of the duties in France, too, will not be without effect, from its tendency to equalise prices there and here, and to-day even their prices would leave a fair margin for shipments. We should say the generality of the crushers do not hold much on hand, certainly not more than at this period last year; and there is every indication of a very large consumption both of oil and cake, with light stocks of both these articles. Prices are not likely, therefore, permanently to recede during the next few months, but their eventual course is far beyond any human calculation.

LINSEED OIL has been a favourite article of speculation during the past year, owing to the anticipated stoppage of supplies of seeds. Prices have consequently been subject to violent fluctuations, and the character of the trade much altered by the unusual elements introduced into it. Our quotation for oil on the 1st January last year was £31, but within two or three days it improved to £33 10s., and the following week to £34, at which it remained steady all the remainder of the month. In February it was quiet, and the price occasionally 10s. to 20s. per ton in buyers' favour. Early in March, sellers again had the advantage, and the home trade bought freely up to £35 per ton. At the close of this month, after the declaration of war, a most extraordinary speculation set in, and every parcel of oil offered was eagerly taken, the price appearing a secondary condition; and he felt himself a lucky man who could say, "I have secured so many tons." The general belief then was, we should have no more Russian seed imported; and it will not appear surprising, therefore, that within a space of four or five days we had to raise our quotations £8 per ton, namely, to £43 on the spot, and as high as £47 and £48 paid for future monthly deliveries. A natural reaction followed, and the price went rapidly down to £40, an occasional sale making at 10s. to 20s. less. During April about 40s. was the quotation, and the encouraging accounts received at this time from the United States, replying to our advices of the rise here the previous month, imparted great steadiness to the market. It soon became evident, however, that the purchases had been made *solely* on speculative account; and as the deliveries upon forward contracts became due, it was further found that the speculators were of a widely different class to those who bought at end of 1853, when many hundreds of tons were actually received, *paid for*, and taken off the market to hold for higher rates. Month by month, now, we had to quote declining rates, and so much still left in weak, speculative hands, and no signs whatever of help by a cessation of the supply of seed, that there was little prospect of any amendment. In May the price fell £3 per ton, and in June it was sold at a further reduction, namely, at £35. This brought consumers to market, and during July it was ready of sale at 36s. August again witnessed much depression (for seed came uninterruptedly to market, in absence of the blockade, upon the belief of which the speculation was originally founded), so that little was doing, although it was quoted at 34s. only. The closing of a large speculative account in September forced prices down to 32s. 10d., when suddenly there appeared such an export demand for the continent as never occurred on any previous occasion. Holders had, however, by this time got so "out of heart" that they met the demand most freely, even after the decline, and it was not until a clearance of several thousand tons had been effected that the market effectually rallied. Early in October, we had advanced to 34s. again; and the home trade being bare of stock, and the American houses appearing as buyers, we quickly ran up to 37s., and some few forward purchases made as high as 39s. The great cake trade at this period again rendered the supply somewhat in excess of the demand; and 36s. was accepted in November, with a spurt at the end of the month to 38s., caused by the great advance then occurring in seed. Last month it was again 37s. to 36s. 10d.; but, as is not uncommon at the end of the year, a disposition to go into stock, coupled with the reduction of the duty in France, thereby opening a new outlet for it, has gradually improved the value to 39s., and large purchases made for future monthly deliveries at 40s. The quantity of oil manufactured has been unusually great, in consequence of the seed crushed this year being almost exclusively of the finer sorts. The export (three-fourths of which, by-the-bye, has been within the last six months) is less than last year by about 1,500 tons, and will be found, we expect, only about 16,000 tons, against 17,500 in 1853, 15,000 in 1852, and 13,500 tons in 1851. At the present high figures for seed, the manufacture must be very unremunerative to the crusher; and we are convinced, from the character of purchases of late, that scarcely any stocks remain on hand. We can but feel sanguine as to this article; the uncertainty as to future supplies of seed alone should render it worthy of notice. But when, in addition to this, we take into consideration the high rates ruling at all the usual places of export, and the relatively higher value of all oils, grease, and tallow, both there and here, it must go more largely into consumption than the make is likely to furnish.

LINSEED CAKES have been in unceasing and large demand all through the year. Their useful properties are now so patent to the farming interests, it is unnecessary for us to make any comments upon them beyond calling attention to the effect which *may be* produced upon prices should our supply of Russian seed be stopped next season. They have ceased now to be a luxury, and have become a necessary for cattle; and we really dare not venture on any opinion as to the prices which might rule in the event contemplated above. Supplies of foreign cake have been much larger during the past year than the previous one, and consisted chiefly of American, to which a decided preference has been given, in consequence of its good quality, and the handiness for conveyance of its packages. The supply was light up to June, when, however, we had rather a heavy import. This was quickly taken up by the dealers, who, anticipating a large future demand, bought very largely to hold over, and at the full rates then current. We continued with a good steady trade until the end of September; and since that time, owing to the great scarcity of feeding stuffs, we have had an enormous demand (fortunately well supplied by imports), and prices have gradually advanced fully 30s. per ton within the last three months. £10 10s. was the current London price in January last, and as the spring advanced they improved to £11 and £11 5s. During the summer £10 10s. was again the value, with a firm market, until after harvest, when a demand set in, which the make was wholly inadequate to meet, and prices rapidly improved to £12 10s. We always have to report a dull trade about Christmas-time; but all our information leads us to believe we shall have an unusual spring demand, and probable further improvement in value. To-day's price is £12 to £12 10s.

RAPE AND OTHER OIL SEEDS.—The import of Rape Seed shows a deficiency into London, but it is more than made up by the excess at the northern ports, where considerable supplies of Danish and German seed have been received. Into the whole kingdom, therefore, it will show a surplus as compared with 1853. Upon the price of 58s., at which we commenced the year for Calcutta seed, a slight improvement afterwards took place; but it was not long maintained, and the value, until the autumn, hardly varied from about 56s. per quarter. In October, signs of amendment appeared; and in November, owing to the rise in Oil, it went rapidly up to 66s. and 68s. Since then, a slight reaction has occurred, and today's value is about 65s. for fine seed. The re-export is 17,000 qrs., or only two-thirds that of 1853, and one-half of 1852. Other Oil Seeds are scarce, and quotations almost nominal. Sesame, 62s. Teel, 61s. Niger, 50s. Gingelly, 62s. Poppy, 64s.

RAPE OIL grows in importance. It is found to be, even at its high value, the most economical light which can be used; and whilst tallow and other burning oils maintain their present prices, there is no doubt the consumption will go on increasing. The price opened firm at £48 to £49; but fair supplies dropping in when the frost broke up, in February, caused a decline to £46, and by beginning of March to £43. It then again improved to £46 in April, but lost the rise in May, and in June touched its lowest point—namely, £42 10s. July saw it quoted £44 to £48; and in August it began to mend again, and sold at £45 10s. Early in September, it receded to £44; but at the end of the month a large oversold account, which sellers were most anxious to close, ran it quickly up to £47; and after that, an immense consumptive demand improved it rapidly until it reached £57 (and in some instances more) at end of November. There is but little expectation of any material decline, whilst other articles used for burning purposes continue at their prices. The present value to-day is £54 to £55.

RAPE CAKES go on steadily increasing in consumption, and bear generally a higher value than formerly. They are extensively used for feeding purposes, and judiciously mixed are stated to exercise a very beneficial effect. The price, which was £6 10s. per ton in January last, was maintained until the summer, and occasionally an additional 5s. per ton paid. It afterwards receded to £5 10s. in September, but the demand has since continued so steadily to increase that £7 was currently paid in November; and although this extreme rate is not now obtainable, the market has a healthy appearance, and with the usual spring demand and light stocks there is no probability of prices giving way.

FISH OILS call for no remark beyond a register of the prices ruling since our last circular was published. Sperm oil was at £91 in January and February; it advanced to £110 in March, and remained firm until June, after which it gradually receded to £103 in July. It has gone on improving since, and is now worth £122. Pale seal scarcely varied from £43 to £41 until last month, when it advanced to £49, and is firm thereat to-day. Southern has been in very short supply; it was nominally £47 from January to May. On arrivals taking place during the summer, however, actual business was done as low as £38 10s., but it has increased in value since August, and is scarce now at £47. Cod oil we had to quote £37 in January, £40 in May, and it scarcely varied afterwards until November, when £43 was the nearest price. It is again scarce, and held for a further advance. Stocks of all descriptions are in the smallest possible compass, and prices show no sign of retrograding.

SPIRITS OF TURPENTINE have undergone their customary fluctuations, prices opening at 54s., advancing to 57s., and then receding to 41s. (which was in May). They have remained remarkably steady since, marking once as low as 39s., and on no occasion more than 44s. To-day they are flat at 40s.

TALLOW and politics went hand in hand last year, and buyers' and sellers' hopes and fears fluctuated with the price of Consols. Scarcely two weeks following have we had to quote the same price; there has always been a rise or fall of 20s. to 60s. per ton.

A very large quantity of tallow was given off on contract on 1st of January last, which had the effect of keeping the market flat until it was placed, when a jump of £5 per ton immediately occurred, namely, from £59 10s. to £64 10s.; some reaction followed, and £62 was nearest value in February. March opened firmly; and when war broke out it improved a further £5 per ton, and £71 10s. was at that time paid once for autumn delivery. It soon became evident, however, the thing had been overdone; and consumption falling off, and a decided "bear" speculation setting in, a rapid decline occurred, and £60 was accepted in May. After that it gradually recovered from the depression, and again touched £65 early in July, and £67 10s. in August. In September, owing to the slack demand, and daily advices of purchases at St Petersburg for transmission *via* Prussia, the price declined to £62 10s.; but in October, some expectation of an interference with that trade again advanced it to £67 10s. About £66 was November's price, but it was not maintained, and again touched £62 10s. middle of last month. Last week it rallied to £64, at which all outstanding December contracts were settled; and to-day there are rather buyers at this figure.

The high price appears materially to have interfered with consumption, for the deliveries since June have fallen off nearly 25 per cent.; and, the production being stimulated through the same cause, we are not likely to have those high rates so confidently predicted a few months ago. Future prices depend on the duration of the present war, and an opinion, therefore, of no value. EDWARDS & EASTTY.

London, Jan. 1.

LINSEED, OILS, AND TALLOW.

SIR,—The natural tendency of political events for some months past has been to keep markets generally in an excited state. Few descriptions of merchandize, however, have been more influenced by them than those with which we are connected. The extent of business transacted, and the fluctuations in value, have been unparalleled, and, as might be expected, inducing speculation on a large scale. Prices, in some instances, advanced 50 per cent., so that, upon the whole, the year closed satisfactorily, and with profit to most parties. At the same time, it must be borne in mind, that the rates now ruling are somewhat dangerous, and more than ordinary caution will be requisite for some time to come, as any decided steps on the part of our Government to enforce more rigidly the blockade of the Russian ports on the one hand, or the slightest indication of peace on the other, would occasion greater changes than any we have now to call attention to.

LINSEED.—Notwithstanding the quantities debarred from shipment in the northern ports of Russia are estimated at 250,000 quarters, the supplies received into London last year exceeded those of the previous one by 15,736 quarters, being 254,400 against 238,664 in 1853. At Liverpool, also, an excess is shown, the import there being 72,071 against 54,500 in 1853. At Hull, however, where they depend more upon Russian ports, there is a great deficiency, the import being 314,641 against 462,981, or 148,340 short. Prices last year ranged wide, 55s. up to 70s. for Black Sea being the extremes. To-day, the value on the spot is 68s. to 70s.; Bombay, 70s.; Calcutta, 68s. to 68s. 6d., down to 53s. to 54s. for Archangel. For arrival, 6d. to 1s. per quarter beyond these rates is demanded. We begin with a stock of 39,000 quarters against 15,550 in 1854; 8,500 in 1853; 12,500 in 1852; and 30,000 in 1851. The following are particulars of Imports and Exports:—

	1854.	1853.	1852.	1851.
	Qrs.	Qrs.	Qrs.	Qrs.
Imported into London......	254,400	238,664	244,347	149,457
Exported from ditto	67,686	51,000	30,561	11,280
Left for consumption in ditto	186,714	187,664	213,786	138,177

Our arrivals last year consisted of 71,531 quarters from the Danube, Black Sea, and Azof; 123,068 East Indies; 28,318 Mediterranean; 8,020 Archangel; 15,382 Baltic; and 8,081 from irregular ports.

LINSEED OIL.—The fluctuations in this article have been great, and speculative transactions excessive. In the early part of last year, £31 10s. was the value; in March and April, £43 10s. to £44 per ton were realized, and some sales for future monthly deliveries were made as high as £46 to £47! To-day the price is £39 on the spot, and £40, March, April, and May.

LINSEED CAKES.—This article last October reached the highest prices paid for some years. Of course it has sympathised, to a great extent, with other produce; but the prices have been principally warranted by the great increase in the consumption. The importation this year was 20 per cent. larger than last year (during which the importation was considerably more than in previous years), and stocks always small. The present stock is 2000 tons, nine-tenths of which are American, New York, and Baltimore, thin, oblong, in two cwt. barrels. The lowest price in warehouse here this year has been £11, and the highest, £13. The present price is £12 15s.; fine oblong, New York and Boston, in bags, £12 2s. 6d.; the same price for Philadelphia and Jersey; oblong Western, in hundred tierces, bags and barrels, £11 15s.; and thick, round Western, £11. Our markets for the last three weeks have been quiet, although a large consumption has been going on. This is usual in December. The general opinion is, that the first three months this year we shall have a large trade at the top prices of last year. The value of linseed cake is confirmed year by year by the produce of crops of corn, &c., manured by the cattle feeding on it; therefore, it is difficult to draw a comparison between it and beans, barley, &c., the manure from which is not so valuable. There are few agriculturists who would pay the same for a ton of beans, barley, &c., as they would for cake; for even if it had the same effect on the cattle, the manure from the cattle would not have the equally good effect on the land as that produced from cake.

RAPE AND OIL SEEDS.—The importation last year did not meet the requirements of our crushers, especially during the autumn months, and Calcutta Rape, which could be bought at 55s. in August, is now worth 64s. Yellow Bombay, 60s.; Calcutta Teelseed, 62s.; Madras Gingelly, 62s.; Bombay Sesame, 63s.; Poppy, 64s. At these rates there are buyers of parcels expected to arrive on or before April, but not beyond, as by that time the prospects of the European Rape Crops will be ascertained, which, to a great extent, must regulate the value of other descriptions. Our Import last year was as follows:—

IMPORTED DURING—

1854.	1853.	1852.	1851.	1850.
Qrs.	Qrs.	Qrs.	Qrs.	Qrs.
64,062	46,000	159,081	72,821	101,112

RAPE OIL.—The demand for burning purposes continues to increase rapidly, which is more felt owing to the great scarcity of all description of Fish Oils. Refined, which could have been purchased in March at £43, and £41 for brown, kept gradually advancing, and early in December £56 to £57, and £55 were paid. Since then the market has receded a trifle, and the value to-day is £54 to £54 10s. Refined, and £52 Brown.

EAST INDIA SEED OIL has followed in the wake of Rape; Ground Nut and Gingelly are worth £49 per tun.

OLIVE OILS.—The market was very uninteresting during the whole of last year, and prices ruled contrary to those of other articles which generally influence them. In January, Gallipoli was worth £63; in July it had declined to £53; and, notwithstanding the great advance in Rape Oils of late, it cannot now be quoted over £57 10s. to £53 per tun; Malaga, £54 to £54 10s.; and Mogadore, £53. This depression is owing to the want of our usual orders for export to Russia, the quantity taken *via* Prussia being trifling compared with former years.

COCOA NUT OIL is becoming a very important article of commerce. The importation into London last year was no less than 9627 tuns against 7000 in 1853, 4165 in 1852, and 2550 in 1851. The enhanced value of Tallow helped the market. The price of Cochin, which was £46 10s. in January, was £58 in August, but cannot now be quoted over £49 10s. to £50. Out of 7799 tuns delivered from our warehouses, 5025 were for export. The following are particulars of Imports:—

	1855.	1854.	1853.	1852.
	Tuns.	Tuns.	Tuns.	Tuns.
The Stock on the 1st January	3263	1875	1510	1853
Imported during	—	9627	7000	4165
Delivered do.	—	7799	7135	4508
Prices, Ceylon	£48 10s. to £49	£45 10s.	£38	£33
„ Cochin	£49 10s. to £50	£46 10s	£40	£35 10s.

Present rates, coupled with those at which Palm Oil, Tallow, and all descriptions of Greases are now ruling, will tend much to develope the resources of our Colonial and Indian possessions, where the production of substitutes for such articles can be increased to an indefinite extent.

PALM OIL, as usual, has kept pace in prices with those of Tallow, and other descriptions of Grease. The value to-day is £48 to £48 10s. per tun, and stocks 360 tuns against 998 in 1854, and 1580 in 1853.

TALLOW.—We have hitherto been so dependent on Russia for these articles, that the existing war has thrown our market into great confusion, and opened wide the doors for speculation. The extremes of prices last year were 59s. and £70s. on the spot. The supplies received through neutral ports are much larger (and, unless interrupted, will continue so) than was anticipated. To-day the value and particulars are as follows:—

	1855.	1854.	1853.	1852.
Stock on hand this day ..casks	85,781	42,256	47,135	61,976
Delivery last week .. „	832	2,057	1,416	2,417
Do. from 1st June... „	48,011	63,682	62,226	65,248
Arrival last week.... „	3,908	10	229	132
Do. from 1st June... „	47,792	82,623	66,733	90,684
Price Y. C. on the spot this day ....cwts.	64s. 6d.	59s. 6d.	45s.	36s. 9d.
Do. town last Friday.. „	65s. 6d.	61s.	47s. 3d.	39s. 6d.

FISH OILS.—Our Colonial Whale Fisheries continue neglected to a great extent, owing to the difficulty in manning the ships. Our supplies of Sperm and Southern are drawn chiefly from the United States. At present our stocks are light, and prices high, which is checking consumption, viz.—

STOCK.	1855.	1854.	185 .	1852.
	Tuns.	Tuns.	Tuns.	Tuns.
Sperm Oil, £120 per tun ..	483	690	1007	1262
Southern Oil, Pale, £47 ditto	96	none	117	157
Seal Oil, £48 ditto	225	477	1073	450
Cod Oil, £44 ditto	323	320	478	560

WHALE FINS.—With the exception of about 65 tons, the probable produce of our Davis' Straits Whale Fishery, the bulk of our supplies have been from the United States. The present value of Davis' Straits is £235 per ton; Polar, £310; and Southern, £190. Our stock is 57 tons, against 75 in 1854, 115 in 1853; and 50 in 1852.

TURPENTINE.—During the past year our distillers have been much interfered with by large importations of Spirits and Rosin from the United States; and the apprehensions we expressed twelve months ago, that the repeal of the duty on the former article would be prejudicial to the manufacturers in this country, have been fully realized, and that useful branch of trade is in a declining state. The following will show the great increase of the Import of the manufactured over the raw material:—

IMPORTED	1854.	1853.	1852.	1851.
Rough Turpentine..	111,026 brls.	116,116 brls.	142,759 brls	102,967 brls.
Spirits	1,900 tuns	1,100 tuns	304 tuns	385 tuns
Rosin......	43,405 brls.	35,694 brls.	20,516 brls.	17,875 brls.

WILSON, ROSE, GRAHAM & Co.

London, January 1, 1855.

ANNUAL REPORT OF THE WOOL TRADE.

SIR,—The past year has been a very eventful one, and the state of the Wool Trade, as well as business in general, has presented some anomalies. Estimated merely by the extent of Exports, and the comparatively active employment of our population, it might be inferred that it has been one of prosperity; but this conclusion is by no means borne out by facts. We have before had periodical panics, produced by over-trading, and other causes; but the past year, on the contrary, has been characterized by great caution, and an evident desire to keep engagements within a narrow compass; at the same time, while the state of our domestic affairs has been free from anxiety, there has seldom been a period more harassing to the merchant exposed to a constant strain, and so generally unfavourable to the commercial community. Shipments to nearly every quarter have resulted in heavy losses, greatly enhanced by the ruinous prices which have ruled for produce on this side, with some exceptional cases. Throughout this period we have had to contend with a stringent Money Market, and provisions at extravagant prices—causes acting upon each other sufficient of themselves to unsettle trade; and while these are still to a great extent existing, and in addition to these, after having enjoyed the blessings of an unusual period of peace, we find ourselves forced into the horrors of war, with the necessary consequence of greatly increased taxation; it may, therefore, well behove the man of business to act with caution under circumstances so new to him. It is, however, fortunate that so much unanimity prevails about this war, and the country is prepared to make any sacrifice to conduct it to a successful result. In the meantime we may expect that commercial enterprise will suffer; and, notwithstanding the internal relations of the country are on a satisfactory footing, there is every probability that the year upon which we are now entering will prove deeply exciting and baffling to ordinary calculations. The general Exports have continued on a scale of magnitude, and will prove little, if at all, less than in the previous year. Of Woollen Goods there will probably be a slight falling off, chiefly to the United States and Germany, but they will still contrast favourably even with 1853, the largest year on record. Consumers have had very trying times to struggle with, but the pressure has been more felt in the vicinity of Bradford than elsewhere, which is, however, not surprising, as in this district more particularly the great increase in the erection of new mills had taken place, the consequence of the previous period of prosperity, many of these new concerns having limited means to back them, and others of older standing which, for some years, have been supported by the too profuse system of credit prevailing in Yorkshire, have had to succumb to the times, thereby throwing a large number of hands out of employment, and causing much distress; but it speaks well for the solidity of the place that it has borne up so well. For a long time they have acted with a wise caution, and, although having had difficulties in obtaining cost price for their production, have at least avoided the losses they must have suffered from accumulating stocks, and this also affords encouragement to hope that when a reaction fairly takes place, it will be both more rapid and enduring. We are happy to notice that the last few weeks have witnessed some improvement, and it is generally supposed that we have passed the turning point; but we must look for more favourable accounts from the United States before we can expect the trade to resume its wonted activity, as it is to that important market we have chiefly to look for an outlet for these goods.

In the Woollen, Flannel, and Hosiery districts the trade, although not brisk, has been tolerably satisfactory: the Carpet Trade less so. For Blankets and other descriptions of heavy goods there has been a brisk demand, and the trade has been both animated and profitable, the supply of the raw material having been very abundant, as well as low in price. The Government Contracts have given a great impetus to this branch of business, and for some months the chief difficulty has been to supply them within the time required. The home trade is at all times influenced by the high price of provisions: and it will, therefore, readily be supposed that, with so many causes acting against it, the demand has been much impeded, but to a less extent than, under the circumstances, might have been expected.

The Imports of Wool show a considerable falling off, amounting to upwards of 18 per cent. This we have been quite prepared to expect, and are only surprised they have not been much greater, considering the continued losses in foreign during the last two years, with scarcely any exception, which have offered no inducements to import, and it is in these the chief deficiency exists. On the other hand, the great increase in the Export of Foreign and Colonial presents a marked, although, considering that prices have ruled so much higher in other markets, not a surprising feature, being about 150 per cent. greater than in the previous year; while of British, about 100 per cent. more has been exported, leaving a very diminished supply available for home use.

AUSTRALIA.—The successful cultivation of the growth of Wool has suffered a severe check during the last few years, and much uncertainty exists as to the future, which for some time, at least, seems likely to continue. The gold discoveries have quite unsettled the ordinary course of business, and caused it to change hands very considerably. Shipments have been made, in many cases, in utter ignorance of the consuming capabilities of those markets, which have, in consequence, been glutted, and the goods have been sold at ruinous sacrifices. The investment of these returns has increased the competition for the purchase of Wool, and caused prices to be forced up, not warranted by accounts from this side, and the result has been very heavy losses on the whole importation of the season. The general condition of the flocks has been less unfavourable than, under the circumstances, might have been reasonably expected; but there has been great scarcity of healthy-grown Wool adapted for combing purposes, which, however, from the great stagnation in the home demand for such qualities, has been less felt, and they have been chiefly sought after by the Continental buyers. When an improvement takes place in the Bradford trade, and it is to be hoped this period is not far distant, the want of such Wools will cause much inconvenience, as hardly any other kinds can supply their place. Unsatisfactory as have been the prices of Australian Wools, they have received very material support from Foreign competition. The attendance of Continental buyers is now regular, and on the increase; and, having once accustomed themselves to the consumption of those Wools, we believe that, like our home trade, they will not be able to do without them, which will tend to insure future competition. This circumstance is well worth notice, when we state that these purchasers, at some of the public sales, have taken off one-fifth of the quantity, in some cases reaching 10,000 bales. At the public sales in February and March, the quantity was unusually large for that period, a good deal of Imported Wool having been kept back from the previous sales, increased by a good deal of second-hand Wools, which operated against prices. At the subsequent sales, there was no material change until the July and August series, when a reaction took place. Prices have since been gradually improving, and there is a prospect that the advance will be fully supported, as this season's imports show but a very trifling increase, and the next spring public sales will be proportionately small. Considering the generally defective condition of Australian Wools throughout the season, the decline has not been so great as would at first seem to be the case, and, consequently, less unfavourable to the grower; still it has been the means of establishing a low range of prices for all similar qualities. Homeward freights have ruled moderate, but outwards they have been subject to great fluctuation. The shipping interest has sustained a serious reaction, and, notwithstanding the number of vessels taken up by Government for transports, and the unprecedentedly large losses to the mercantile marine of the world during the past twelve months, computed at not less than 4,000 vessels, the general rates of freight have considerably declined.

CAPE OF GOOD HOPE.—This Colony is capable of producing very superior Wools, and such are fully esteemed; they at all times meet with ready sale, at full market value, but, unfortunately, they form but a very insignificant portion of the Imports, which consist of most irregular and uncurrent qualities. These throughout the year have been difficult of sale, even at a great reduction in price.

GERMAN continues to engage less attention, and, notwithstanding the reduction in prices established at the principal fairs, they have still ruled too high to induce Imports in comparison with Colonial Wools; the great bulk has consequently been retained for home consumption, but there has also been a fair demand for the Netherlands and France.

SPANISH AND PORTUGAL.—The better kinds in fair condition have been generally in some request, but without offering any margin of profit to import, and the receipts have been limited in consequence. Long Oporto Fleece has been of sluggish sale, and transactions have only taken place at intervals; but the stocks having been in few hands, have commanded full prices. For both Fleece and other kinds there is at present a fair inquiry, but the trade do not seem willing to pay the prices they are held at.

UNITED STATES.—The operations in Wool have been very unimportant, the state of their trade having been as unsettled and depressed as our own, suffering even from a great tightness in the Money Market, and Wools of domestic growth have fallen considerably in value, but have lately been gradually recovering. At intervals some trifling shipments have been made from this side, and we have received from thence several thousand ballots of Peruvian, besides some other parcels of Foreign and Colonial Wools, which have been sent here in the hope of a better market.

BUENOS AYRES AND THE RIVER PLATE.—In our last annual report we alluded to the competition then existing on the other side, and expressed an opinion that considerably reduced receipts might be expected in the present year, which has been borne out by a falling off, as compared with the previous year, of nearly 50 per cent., or 4,317 bales. There has been a great proportion of uncurrent qualities, which have been very difficult of sale, and in most cases entirely neglected. The present stock is almost entirely of this kind, for which, although holders are quite prepared to meet the market, no buyers can be found. For the better and superior qualities, either washed or in the grease, there has generally been a satisfactory demand, and particularly for the best-managed flocks, which have been gaining favour among our home consumers. These have realised prices equal to Colonial and other Wools of similar qualities and conditions. They are at present much sought after, and we think the new arrivals will reach a good market. The supply of Cordova has been limited: it has maintained its price better than most other low Wools, and is at present in good demand, owing to the scarcity of Oporto, Egyptian, Turkey, and other Wools of similar staple.

PERUVIAN AND ALPACA.—We commenced the year with a considerable stock of Alpaca (the nominal value being then 2s. 6d. per lb.), which was greatly increased by subsequent arrivals, and the demand for many months continuing quite inactive, it receded to 1s. 6d. per lb., which caused much competition, and the price rapidly rose to 2s. per lb., at which the market was cleared, and also a large quantity was sold to arrive. It has since advanced to 2s. 8d. per lb., but there have been few buyers at this figure, even for the most approved quality and assortment. The Import has been much less than in former years; there is no stock on the spot, and some sales have been made to arrive. The supply of Sheeps' Wool has fallen off considerably in consequence of the unsatisfactory state of our market, and the civil war on the other side has caused a great suspension of trade.—The latest accounts report that both Alpaca and Sheeps' Wool had been seized by the revolutionary force, for the purpose of making barricades.

EAST INDIA.—We have a still further increase to notice, the receipts at this port having exceeded 28,000 bales, being nearly two-thirds of the entire Import, which, in the face of such continued losses for now a considerable period, is enough to occasion some surprise. These Wools are chiefly the growth of districts far remote from the shipping port, and engagements are entered into at the beginning of the season. It is rather questionable whether the large receipts during the last two years may not be attributed to a former accumulation of stocks, and the high prices ruling here some time back must, at any rate, have stimulated shipments to the fullest extent, but the present low value can, we think, offer little or no encouragement, after deducting heavy freight, transport, and other charges, which seems to be borne out by the diminished quantity now on the way; and although the total imports show an increase of nearly 8000 bales on the twelve months, the shipments from Bombay for the same period, made up to the 31st of October, are only 900 bales in excess of last year's, which is more than counterbalanced by 1737 bales lost at sea, and the supply has been further reduced by 800 bales destroyed at the late fire here. This season's shipments have comprised an unusually large proportion of ill-classed and badly-conditioned Wools, in the latter respect showing an inferiority of fully five to ten per cent. As this trade promises to become of great importance, second only to that from Australia, it is absolutely necessary that shippers should get up the Wool with the greatest possible care, to establish a character for marks, or brands, which, as they are at present sent home, are in many, or even the most, cases, not at all to be relied upon, often so completely unmarketable that it is difficult to estimate their value. It is, therefore, not surprising that such kinds are at times sold at a considerable sacrifice, and in great disproportion to current qualities, occasioning great disappointment to shippers. With the views we have for some years past entertained of this trade, we think we are warranted in speaking somewhat strongly. When the Import was not one-third of the present extent, we stated our opinion that we could readily find a market for any quantity, and that we had more to fear from an inadequate supply than from any excess. We still adhere to this opinion, notwithstanding the large increase that has of late taken place, and, being peculiarly adapted to the requirements of our trade, current qualities at all times can be readily disposed of at their full market value.

CHINA has engaged little attention, the import having been very limited.

RUSSIA.—Imports have fallen off, being less by 12,000 bales than in the previous year. It was to be expected that the war would cause a complete cessation of the trade, and Wool, being a bulky and comparatively low-priced article, could not afford the heavy charge for transport which other goods, reaching us through neutral ports, have been subjected to. The receipts have consisted chiefly of Wools purchased long ago, which were detained owing to the want of shipping, and in order to avoid the enormously high freights which prevailed at the time. The demand for common Wools there has kept up prices quite beyond their value in this country. We have never known Russian Wools so generally neglected as during the past twelve months, particularly autumn wools, owing to the large imports and low price of East India; and we have, consequently, as large a stock as in ordinary periods. Fine and other qualities of brook-washed and scoured Wools have not been in much demand, and there is very little on hand.

MEDITERRANEAN Wools show a very considerable falling off, 12,856 bales against 24,925 bales, which we quite expected, as we stated in our last annual report, from the result of the war. The growth of Wool in the Turkish provinces, which is of considerable importance, must have been greatly impeded, and much less than usual has been sent to Trieste, which is the great entrepôt where they are generally assorted and prepared for other markets. At all the Mediterranean ports prices have ruled very considerably higher than with us; and for some months past supplies have been fully absorbed by the demand for army-clothing for Austria, and they have also been the chief purchasers at Odessa, even incurring the heavy expense of land and railway carriage from that quarter.

EGYPTIAN.—The Import has been to a limited extent, and prices have suffered from the decline in English Fleece and Skin Wools. They are not so carefully got up as they used to be, but well-classed parcels have generally met with current sale at full value, and there is at present a good demand for such kinds.

TURKEY GOATS' WOOL or MOHAIR for many months participated in the inactive demand for Alpaca, and receded in value in the same proportion. We have generally found low prices for this article accompanied by greatly diminished receipts, and such has proved the case during the past year; but, since prospects have much improved, we may look forward to increased supplies, and there must be a large quantity remaining on the other side to send forward, which present prices will induce them to ship. A considerable portion of this trade, from the facilities of steam communication with this port, has been attracted hither, and importers have found that there is no difficulty in disposing of it here on the best terms; but the trade being chiefly in the hands of Greek Houses, whose chief establishments are in London, they show every preference for that market, even to their own prejudice at times, by having the Wool sent up there for sale.

MOGADORE AND BARBARY.—Good and clean parcels have alone been in favour; all other kinds much neglected, particularly Bengasi, Tripoli, and other similar Wools usually received from Malta, which, being full of sand, and generally in very damp condition, are next to unsaleable. The supply of these has been very large during the last eighteen months, and the pretensions of shippers have in many cases been above what the highest prices prevailing in this country at any period for many years past would have warranted. A large accumulation of stock was the consequence; but of late, tempted by the very low prices which holders were prepared to accept, a considerable clearance has been made, although at most ruinous losses. Mogadore and Mazagan, when carefully got up, and in good condition, generally meet with ready sale, and for these prices have ruled satisfactorily; but inferior parcels have been much neglected, and, although prices have suffered a considerable decline, it has not been greater in proportion than in other Wools.

ICELAND has generally been in fair demand, at prices fully equal to other descriptions, but, being held at higher rates than our market could afford, sales have proceeded languidly. Some transactions have taken place during the past month, and the last prices paid were 8½d. per lb. for average parcels of white washed Fleece, and 7d. per lb. for unwashed. Several cargoes, amounting to 700bags, although appearing in our imports, were at once ordered round to Copenhagen, the owners not being able to dispose of them here at prices satisfactory to them.

DOMESTIC WOOLS.—In English, the ruling feature throughout the year has been great inactivity, there being neither inclination nor encouragement for buyers to purchase freely, and growers have shown great unwillingness to accept current prices, which have certainly been very low, and to this cause may be ascribed the decline in all kinds of Foreign. The result of this necessary caution induces us to think that the stocks held by consumers and dealers are extremely light, and—in the present position of the market for Foreign, with a limited supply on hand, very few arrivals on the way, and as long as the disparity exists between prices in this country and in the markets abroad, our stocks are rather likely to diminish than increase—we think, therefore, there is every reason to expect that all lower qualities of English Wools will advance in price. Irish Wools have met with a free competition, owing to an extensive French demand, and the quantity taken for that quarter is greatly in excess of previous years; comparatively little remains in the hands of growers, who are not disposed to part with it unless they can obtain their own prices. Scotch.—For the greater part of the year the market was indifferently supplied, and sales were consequently limited; but of late they have come forward more freely,

and an active business has been done, the chief demand having been to supply orders for military clothing, and as long as this continues they will meet with ready sale at full value.

SHEEPSKINS have not generally been in much demand. The best qualities, comparatively free of burr, have engaged most attention, and for these prices have been better supported than for inferior parcels. **HUGHES & RONALD, Wool Brokers.**

Liverpool, January 1, 1855.

THE WOOL TRADE OF 1854.

SIR,—We have but little satisfaction in reviewing the course of business during the past year—an eventful one both in the mercantile and political world. It opened with an improved feeling in the trade, and a fair demand for most descriptions of Wool; but the continued uncertainty of the Eastern question, and an uneasy feeling in the Money Market, checked anything like activity in the trade, and prices generally exhibited a downward tendency till the month of May, at which time, from a combination of untoward circumstances, the increasing tightness in the Money Market, and consequent advance in the rate of discount by the Bank of England to 5½ per cent., there was an extreme depression in commercial affairs generally. The new clip of English Wools opened at a reduction of 25 to 30 per cent. on the ruling rates of the previous season; and at the public sales of foreign and colonial Wools, which took place in London at that time, a further reduction of 2d. to 3d. per lb. was submitted to on Australian, and a proportionate depreciation in low foreign Wools. In the months of July and August, however, more confidence began to be manifest—we continued to enjoy a long interval of splendid harvest weather, money became more plentiful, and the low prices of Wool ruling in this country naturally attracted the attention of our Continental and transatlantic neighbours; an active Export demand sprang up, which improved the tone of our market, and, as the prospect of a favourable and abundant harvest became more apparent, the high rates ruling for corn up to this period received a considerable check, while the prices of Wools gradually improved, and a portion of the reduction experienced in the earlier part of the year was partially recovered. This continued, with but slight variation, until September and October, when the upward tendency in the corn market, and renewed apprehensions of a scarcity of supplies, began to cause considerable uneasiness. A check was again given to the trade, and prices generally experienced a slight decline. This was more particularly felt on English and all Wools suitable for combing purposes. Several considerable failures were announced in this branch of the business, and prices of these descriptions gave way materially. The year closes, however, with small stocks of all descriptions, and the great falling off in the amount left for home consumption at the present period will probably prevent any further material reduction in prices, and tend to create more confidence in prospects for the new year. The decrease of Imports, as compared with the previous year (made up to 5th Nov.), amount to 11,157,093 lbs.; and when we add to this the extraordinary increase of Exports for the same time, amounting to 16,550,736 lbs., we naturally expect that so large an amount (say, in round numbers, 100,000 bales) cannot be subtracted from the market without having a beneficial effect on the prices of stocks remaining on hand for home consumption.

AUSTRALIAN AND CAPE.—The Imports of these Wools again show a slight increase as compared with the importations of last year. The condition, washing, and assortment of a great bulk of the Wool has been far from satisfactory; and at the various series of sales during the year, the proportion of unwashed, and what is termed ill-conditioned flocks, has been very large. Wools of this kind have, consequently, suffered a greater relative depreciation. On the other hand, for such flocks as were well managed, and in good condition, there has been a very good demand, and an active competition both for the home trade and for export, and prices of these descriptions have fully recovered from the depreciation submitted to at the May sales. These sales, the first series of the new clip, commenced in London on the 11th of May, when 41,437 bales were brought forward. The extreme depression manifest in commercial matters generally at that time, as noticed in our leading paragraph, caused a reduction of fully 2d. to 3d. per lb. on prices current at the commencement of the year. At the July and August sales, however, as well as at the last series in October and November, a decided reaction was manifest, and the reduction above quoted was nearly, and in some cases entirely, recovered, leaving the quotations at the close of the year, with some slight exceptions, very much on a par with the prices current at the close of last year. The entire quantity disposed of at the close of the year was 197,432 bales against 183,637 bales in 1853. The next series of public sales will commence about the middle of February, when the late arrivals, and about 19,000 bales held over from last sales, amounting together to about 40,000 bales, will be brought forward; and we have every reason to hope that present current rates will be firmly supported, as, notwithstanding the decreased consumption in the worsted districts, the clothing branches of the trade both here and on the Continent continue in a very active state, and will doubtless tend to check any further depression on the price of these Wools.

SPANISH AND PORTUGAL.—The supplies of Wool from these quarters during the past year have been very limited, being less than one-half of the previous year's imports. Good clean flocks of Spanish have been in pretty good demand; but the relatively lower prices of Australian seem to interfere year by year with the consumption of these Wools, and the quotations show but little encouragement to importers from that quarter. In Spanish Frontier we regret to observe a great falling off in the washing and getting up of the past season; the consequence has been that they have been neglected, and quite out of favour during the past twelve months; and the reduced quotations will, we trust, be sufficient evidence to shippers of the great necessity of paying more attention to this important point. The same remark is also applicable, although in a less degree, to the Lisbon or common Alentijo Wools, which, however, have been in pretty good demand. Stocks of both descriptions are quite exhausted, and we trust that this year's shipments will show the desired improvement in condition which will doubtless again bring them into the accustomed favour with our manufacturers. Oporto and Castelbranco have participated in the general depression; they have, however, commanded a fair share of attention, and are of current sale at the reduced quotations. Stocks of these sorts are also very light.

EAST INDIA.—We have again to notice a remarkable increase in imports from this quarter, being 43,753 bales against 36,524 bales in 1853. These Wools have commanded throughout the year a steady and extended competition both for home consumption and for export, with less variation in prices than could have been expected—a convincing proof of the enhanced value and importance of this branch of the trade. The active demand for blankets and other low woollen goods, consequent upon the war, will doubtless tend to keep prices of these descriptions pretty firm, notwithstanding the large quantities which are now regularly brought forward for public competition.

PERUVIAN AND ALPACA.—For sheep's wool there has been a good demand, particularly for the finer sorts, both washed and unwashed. They have chiefly been bought up as they arrived, holders meeting the market at the current rates. The high rates ruling for Alpaca at the date of our last annual report caused a complete check to the demand for this article, and for the first few months it was quite neglected. Prices gradually receded until the middle of the year, when some large sales, say 4 to 5000 bales were made at about 18d. per lb., which again brought the article into notice, and, from that period, prices gradually recovered. Large transactions have been entered into, both on the spot and to arrive. The last sales reported

were at 2s. 2d. to 2s. 3d. per lb.; and stocks, which are now unusually light, are held firmly at our quotations.

MEDITERRANEAN.—The arrivals from these ports show a great falling off from the previous year's imports. The increased demand for the Continental markets, and the low rates ruling here for these descriptions, have precluded the possibility of shipments to this country to any advantage during the greater part of the present year. The low prices at which our own home-grown Wools were put on the market has caused Turkey, Smyrna, Syrian, Egyptian, and other low Wools from this market, to be very much neglected, and prices have been proportionately depressed. Stocks, however, of all sorts are very light, and not unduly pressed on the market, and we have no doubt will, therefore, participate in any improvement which our market may exhibit in the course of the present year. Mohair has recovered the depression which it had experienced some months back, and large sales have lately been made at the improved quotations. There has been a general falling off in the imports of these Wools; and, from late accounts, we shall have a short supply this season.

RUSSIAN.—It was generally expected that the war would put a stop to the importations from this quarter, and that this might, consequently, have a favourable effect on the stocks held here. The return of importations for this year shows that, although much below the quantity imported last year, which was in excess, about an average quantity has found its way to this market. There has been very little demand for Donskoi fleece, and prices are almost nominal. The present stock is now pretty generally held for 9d. Some lots have, however, been forced off considerably under this price, 8d. to 8½d., and some inferior parcels still lower. Of fine wools, Merino, Odessa, and Zegai there is very little on the market. These sorts are in better demand, and saleable at our quotations.

BUENOS AYRES AND ENTRE BIOS also exhibit great reduction in the Imports to this country for the past twelve months. During the earlier part of the year these Wools were much neglected, but of late they have attracted more attention, and large sales have been made both for export and home trade at fair prices, leaving the market but very moderately supplied, and prices are now pretty well supported. Cordova has been in fair request, and pretty saleable throughout the year, without any great variation in price.

ICELAND.—The Imports have been small, only 2,393 bales against 7,571 bales in the previous year. The demand throughout has been very limited, and holders generally not feeling disposed to meet the market at the decline, but few sales have been made, and one or two cargoes have been re-shipped in the expectation of realising better prices than our market would afford.

BRITISH AND IRISH.—The new clip commenced in May and June, at an average reduction of 25 to 30 per cent. on prices current the previous season. The very favourable prospects for the harvest, and a better feeling in the Money Market, caused a more active demand in July and August, and prices advanced generally ½d. to 1d. per lb. This was not, however, maintained for any time. The anticipated effect that the abundant harvest would have in lowering the price of food was found to be delusory; a general mistrust was evinced in the trade, which was further enhanced by the announcement of some considerable failures in the manufacturing districts; purchases were confined to the immediate requirements of the trade, and prices again receded to the lowest point at clip-day. There has, however, within the last fortnight been symptoms of improvement; stocks in the manufacturers' hands are getting exhausted, and the dealers begin to find it will be difficult to replace their stocks in the country at the prices they have been lately selling out at. There has consequently been a slight reaction, and prices of fine and bright-haired Wools may now be quoted ½d. per lb. higher than they were a fortnight ago.

W. Graeme & Co., Wool Brokers.

Liverpool, January 1, 1856.

THE NEW FRENCH TARIFF

FOR REGULATING THE DUTIES ON COLONIAL AND FOREIGN PRODUCE.

Until it shall be otherwise decreed, the duty upon the importation of the following articles are fixed provisionally as follows, vis. :—Animal Grease of all sorts—In French vessels, from India, 2 f. ; from elsewhere, 5 f. In foreign vessels, 8 f. per 100 kilogrammes. Fish Grease of foreign take — In French vessels, from places beyond Cape Horn and the Cape of Good Hope, 10 f. ; from other places out of Europe, 15 f.; from entrepôt, 20 f. In foreign vessels, 30 f. per 100 kilogrammes. Fixed Pure Oil, vis. :—Olive—In French vessels, from the country of production, 10 f.; from elsewhere, 13 f. In foreign vessels, 15 f. per 100 kilogrammes. Seed—in French vessels, 10 f. In foreign vessels, 15 f. per 100 kilogrammes. Palm, Cocoa, &c.—In French vessels, from French colonies and settlements in India, 1 f. 50 c. ; from the west coast of Africa, 1 f. 50 c.; from other places out of Europe, 5 f. ; from entrepôt, 8 f. In foreign vessels, 10 f. per 100 kilogrammes. Oil Seeds : — Seasamum — In French vessels, from French settlements in India, 40 c. ; from other parts of India, 2 f.; from French American colonies, 80 c. ; from the West Coast of Africa, 3 f. ; from countries on the White Sea, the Baltic, the Black Sea, or the Mediterranean beyond Capes Rasat and Matapan, 4 f. ; from elsewhere, 5 f. In foreign vessels, 7 f. By land, from neighbouring countries, 5 f. ; from elsewhere, 7 f. per 100 kilogrammes. Colza—in French vessels, from French settlements in India, 20 c. ; from other parts of India, 1 f. ; from French American colonies, 40 c. ; from the West Coast of Africa, 1 f. 52 c. ; from countries on the White Sea, the Baltic, the Black Sea, or the Mediterranean beyond Capes Rasat and Matapan, 2 f. ; from elsewhere, 3 f. In foreign vessels, 5 f. By land, from neighbouring countries, 3 f. ; from elsewhere, 5 f. per 100 kilogrammes. Linseed and others—In French vessels, from French settlements in India, 10 c. ; from other parts of India, 75 c. ; from French American colonies, 20 c. ; from the West Coast of Africa, 1 f. ; from countries on the White Sea, the Baltic, the Black Sea, or the Mediterranean beyond Capes Rasat and Matapan, 1 f. 50 c. ; from elsewhere, 2 f. 50 c. In foreign vessels, 4 f. 50 c. By land, from neighbouring countries, 2 f. 50 c. ; from elsewhere, 4 f. 40 c. per 100 kilogrammes. Candles—Tallow, 10 f. Stearic Acid—in the lump, 25 f. ; manufactured, 35 f.

Until it shall be otherwise decreed, the duties payable on the importation of the undermentioned articles are fixed provisionally as follows :—Sugar of quality not exceeding that of the present standard, No. 1—In French vessels, from French colonies beyond the Cape of Good Hope and America, the present duties ; from China, Cochin China, the Philippines, and Siam, 48f. ; from other countries of India, 50 f. ; from other places out of Europe, 58 f. ; from entrepôt, 63 f. ; in foreign vessels, 68f. per 100 kil. Sugar of quality exceeding that of the present standard, No. 1, the same duties as above, and further 3 f. per 100 kil. Raisins, dry—In French vessels, 25 c. ; in foreign vessels, 2 f. per 100 kil.

Molasses imported for the purpose of being converted into alcohol to be subject to the following duties :—Molasses, in French vessels, from French colonies, free ; from countries out of Europe, 3 f. ; from entrepôt, 8 f. ; in foreign vessels, 13 f, per 100 kil. The distillation of molasses imported under the above conditions can be carried on only in the establishments under the permanent superintendence of the Customs or of the Excise; whilst carried on, all other operations are forbidden. The minimum return in alcohol of the molasses is fixed at 38 litres for every 100 kil. A sealed sample, taken according to the forms prescribed in cases of transit, shall accompany the molasses, and serve to identify it on its arrival at the distillery. The carriage of molasses shall take place only in conveyances sealed and secured by the Customs.

(Signed) NAPOLEON.

TOWN DRAINAGE, AND MANURING THE LAND.

SIR,—Un fait accompli on the above momentous question, must necessarily divest it of much of its perplexity. By your able résumé du papier donné par Mons. le Professeur Way, in the *Mark Lane Express* of the 23rd October last, it appears that the solid matter from the human excrements that passes into the sewers of towns is mixed with 1,400 times its weight of water—an estimate that does not differ very much from that given by me of 1 of matter to 1,300 of water; so that it may now be reasonably concluded that the coup-de-grâce has been given to the idea of the use of steam for town drainage, and application of the sewage to the irrigation of the land.

I am quite prepared to allow all that is advanced on the value of the soluble salts, and the extent to which these prevail in sewage; but in the present crude state of our information we may prejudge the case by stating that these are the matters "important to vegetation," to the exclusion of all others, even allowing that they all escape. I need scarcely remark that it is only a few years since the value of guano was first appreciated, and that within a very recent period Mr. Pusey has demonstrated that its influence is mainly referrible to a simple element, and this element, nitrogen, in the most nitrogenous vegetable productions, does not prevail to the extent of three per cent. With such a fact as this on record, it will readily be allowed that there may be other elements that also possess a stimulating influence; and so far as my researches have gone, I have every reason to believe that, under a proper putrefactive process, sulphur is one of them, and prevails to a large extent in sewage, and must, therefore, form an element of the vegetable kingdom. This substance, I need scarcely observe, enters largely into the constitution of all the soft parts of the animal frame, more especially the brain, and therefore plays an important part in the animal as well as the vegetable economy. Like carbon it is insoluble, but in its combination with hydrogen forms a soluble gas of great specific gravity, and possessing a great affinity for solid matter, which abounds in sewage, more especially in that of towns where there is a large traffic.

The solid matter of the sewage of London valuable to agriculture may therefore be estimated, *at the least*, at one half-pound per individual per day, and will produce about 200,000 tons annually; and estimated at only £5 per ton, will yield something like £1,000,000, whilst the expense of collection must be comparatively small. But supposing that it did no more than repay the outlay, the benefit which the townsman will derive from the increase of produce, and consequent reduction of price in food, to say nothing of health, must prove very great; and I may be permitted to remark that there must be a great difference in the value of manure obtained by precipitation, and by deposition and filtration, since in the one the lime forms the staple, whilst in the other the sewage will constitute the main bulk. Sulphur and carbon are both laid up in store in the coal-bed formation!

FRANKLIN COXWORTHY,
Author of "Electrical Condition."

Pollet, Dieppe, Nov. 29, 1854.

N.B. In England, by a wasteful and unnecessarily laborious putrefactive process, we waste about half the fertilising qualities of the manure in farm yards: here the highest part of the yard is selected for its collection, and by the side a gutter is formed to carry off all the liquid. On my representing to the farmers the loss that took place, I received for reply—"Que voulez-vous, Mons.? C'est l'habitude du pays. Il y a sans doute une grande perte; mais nous avons beaucoup de fumier.' And so they actually wash out their farm yards!—The wheat looks very healthy.—F. C.

AGRICULTURAL QUERIES.

SIR,—I would consider myself particularly obliged if any of your numerous horticultural readers would inform me of the most effectual means to destroy the grub, or small insect of that species which infests the soil in my garden, so as to prevent the maturing of such crops as savoy, cabbages, broccoli, curled greens, &c., and which I regularly plant in due season, hoping to have a winter's supply of these useful vegetables, but for years past I have not had any of these products worth mentioning; for, although appearing to thrive pretty well for five or six weeks after planting, they regularly die and pine away, with scarcely a head of life left? On drawing the decayed plants from the ground, I find the roots beset with a kind of fungus-like appearance, growing to the size of a large marble or walnut; on crushing these club-roots (as provincially called) we detect a number of the grubs, &c., as before mentioned, which of course are the cause of the evil complained of. As a means of their destruction, we have heavily limed the soil with fallen, not slacked lime, and dug it into the ground thoroughly; we have also incorporated a liberal supply of salt into the soil: still these supposed deleterious ingredients have little or no effect upon this pestiferous nuisance. The soil is in good heart, and tolerably fresh as to age for garden purposes. As I am thus circumstanced, the garden is nearly a useless appendage to my house, in reference to the products stated. I may say, in addition, that soot has also been tried, but to no effect.

I shall really feel thankful if any of your practical gardeners can suggest, through the medium of your ably-conducted journal, an effectual remedy for so vexatious an evil.

Yours,
A LIVERPOLIAN.

SIR,—Could you, or any of your numerous readers, inform a Gloucestershire farmer, through the medium of your paper, of an efficacious cure for the hoose or husk in calves? If so, they would confer a boon upon A SUBSCRIBER.

[We cannot prescribe for calves unless we see them: the practical course is to apply to your veterinary surgeon. All we can safely do is merely to give an idea of what is generally done. Bleed (gently) to check inflammation of the mucous membrane; then give a dose of Epsom salts, with a little ginger, to clean the same of irritating matter; warm mashes, drinks according to age, may follow, with a warm and well-ventilated house. Such treatment will generally succeed if the disease is taken in time; otherwise, a cure may be difficult. We have often succeeded with a dose of Epsom salts, followed by warm skimmed milk, without bleeding. Where hoose arises from the dam's milk either being too strong or of bad quality, of course such must be changed; and sometimes too much rich milk will cause looseness, or improper treatment and food at weaning, deranging the bowels, and producing inflammation and hoose.—ED. M.L.E.]

SIR,—Will any of your readers who have had experience inform me which they have found the simplest and best machine for root-grinding? I see several advertised—"Burke and Barter's," "Kealey's," and "Phillips's," all "patent;" but having no knowledge of their merits, am quite at a loss which to try.

I am, sir, respectfully yours,
Cheltenham, Jan. 12. A SMALL FARMER."

SIR,—Could you, or some of your numerous readers, inform a constant reader, through the *Mark Lane Express*, when bones were first used for manure in England?

Yours truly,
Stockport, Dec. 14*th*. A SUBSCRIBER.

ANSWERS TO AGRICULTURAL QUERIES.

FIRST BONE MANURING.

In "Donaldson on Manures," p. 104, Mr. Dodson is stated (apparently, but not expressly, from the Doncaster report) to have observed, in 1770, the great increase of wheat on a patch near Sheffield, where a heap of bones had lain, and to have followed up the hint boldly, both for himself and his neighbours. And in "Johnson's Fertilizers," p. 126, first edition, Colonel St. Leger is quoted, from the Doncaster Agricultural Society's Report, as having used bones for manuring, at Warmsworth, in 1775. But I find no evidence of their having been in general estimation, for a good many years after that.

The first account I can find of them, on grass land, is in the *Lincolnshire Grazier*, published in 1808; and if memory serves me right, their great publicity was attained by experimental (or casual) application to the Cheshire cheese-pastures; the date I cannot recollect. In the report on Cheshire farming, in the Royal Agricultural Society's *Journal* for 1844, it appears that the Cheshire landlords will pay for this application of bones, the tenant engaging not to break up the pasture for a given number of years.

The history of bone-manuring will probably be found in the "Transactions" of the Society of Arts, from about 1800, or in the Doncaster Agricultural Society's Report, of which the date is unknown to

Plymouth, Jan. 3. J. PRIDEAUX.

SIR,—Your correspondent, "A Subscriber, Stockport, Dec. 14," asks a very sweeping and extensive question—when bones were first used for manure in England. Having been extensively connected with their manufacture, and also with the mechanism and machinery, I give him the information I possess. In 1796-7 Lord Carlisle, of Castle Howard, used bones (upon his private farm in hand) for manure, and the manufacture was by horse-power and stampers. In 1804 toothed rollers, very nearly as now used, by water-power, were substituted for the stampers: the machinery was put up and fixed by my late father, Jonathan Booth, millwright and engineer, of Malton and Hull. In 1806-7 a horse mill and rollers were put down in Hull for a Mr. Clark, merchant, and at Stockwith-upon-Trent, near Gainsborough, a roller mill by steam-power, by the Messrs. Darley; and Mr. Clark and Messrs. Darley were the very first who offered and sold bones to farmers as manure, and an article of commerce in this quarter of England. Sir Tatton Sykes, in 1810, used bones upon his farm at Packthorp, near Driffield, which were reduced or manufactured by axes, mallets, and hammers; and a very few years after, they were regularly gleaned after the plough, and submitted to the portable toothed roller mill (just invented), and properly ground. The Messrs. Darley at Stockwith, and at a steam mill which they had now put down in Hull, became by far the most extensive bone-crushers in the north of England. In 1823 I erected a water mill at Malton, and at the close of that year brought the first cargo of rough bones up the river Derwent. Shortly after this, under very inauspicious circumstances, I also put down a steam mill; and so rapid was the increase of the trade, that in a very short period it rose from a single cargo (38 to 44 tons) to nearly 2,000 tons annually to the two mills.

I am, sir, respectfully, your obedient servant,
Boro' Bridge, Jan. 5, 1855. JAMES BOOTH, C.E.

SIR,—In answer to the query of "Seek Knowledge," in the January number of the *Farmer's Magazine*, I beg to say that the amount of keep which may be anticipated from the land sown with rapes is little or nothing; moreover, if there be any, it will be dangerous food for sheep at the time mentioned. Perhaps I may be permitted to suggest that a much better plan would be to let the rapes stand for seed. I myself on the 19th of August, 1854, sowed 9 acres with white clover and grass seeds for pasture, mixed with which was a quarter of a peck of rapeseed per acre, intended principally for a cover to the young seeds during winter. On account of the dry weather the seeds did not vegetate till the late rains. I therefore now intend to let the rapes stand for seed, and anticipate having a very good pasture when they are cut in July, as I have acted in a similar manner before, and always found it answer.

I am, yours &c., E. S. P.

SIR,—I am glad to give my few years' experience to the treatment of black-quarter in young cattle to your "Enquirer" of this week's paper. In the year 1846 or 1847, I lost fourteen calves, from 6 to 12 months old. I had several cow doctors, who physicked and bled, setoned the dew-lap, changed them to various pastures, but to no avail until I had them nerved. I have continued to do so, and not lost one that was nerved since 1847, in the black-quarter.

I am, sir, yours respectfully,
THOS. STEPHENSON.
Broadgate, near Beverley, Yorkshire,
Dec. 27*th*, 1854.

LIVERPOLIAN.

SIR,—Let your correspondent, who signs as above in your last paper, try the ammoniacal liquor from gas works; one part of liquor to four of earth, or bog mould, &c., to destroy grubs. It is also a good manure. J. R.
Limerick, Jan. 6*th*, 1855.

COCOA-NUT OIL.—This is becoming a very important article of commerce. The importation into London last year was no less than 9,627 tons, against 7,000 in 1853, 4,165 in 1852, and 2,550 in 1851. The enhanced value of tallow helped the market. The price of Cochin, which was 46*l.* 10s. in January, was 52*l.* in August, but cannot now be quoted over 49*l.* 10s. to 50*l.* Out of 7,799 tons delivered from our warehouses, 5,025 were for export. The following are particulars of imports: The stock on the 1st January, 1855, was 3,293 tons; 1854, 1,375 tons; 1853, 1,510 tons; 1852, 1,853 tons; 1851, 3,651 tons; imported during 1854, 9,627 tons; 1853, 7,000 tons; 1852, 4,165 tons; 1851, 2,550 tons. Delivered during 1854, 7,799 tons; 1853, 7,135 tons; 1852, 4,508 tons; 1851, 4,348 tons. The prices of Ceylon, on the 1st of January, 1855, were 48*l.* 10s. to 49*l.*; 1854, 45*l.* 10s.; 1853, 38*l.*; 1852, 33*l.*; 1851, 29*l.* Of Cochin, 1855, 49*l.* 10s. to 50*l.*; 1854, 46*l.* 10s.; 1853, 40*l.*; 1852, 35*l.* 10s.; 1851, 32*l.* Present rates, coupled with those at which palm oil, tallow, and all descriptions of greases are now ruling, will tend much to develop the resources of our colonial and Indian possessions, where the production of substitutes for such articles can be increased to an indefinite extent.

DURATION OF VEGETABLE LIFE.—Lord Lindsay states, that in the course of his wanderings amid the pyramids of Egypt, he stumbled on a mummy, proved by its hieroglyphics to be at least 2,000 years of age. In examining the mummy after it was unwrapped, he found in one of its closed hands a tuberous or bulbous root. He was interested in the question how long vegetable life could last, and he therefore took that tuberous root from the mummy's hand, planted it in a sunny soil, allowed the rains and dews of heaven to descend upon it, and in the course of a few weeks, to his astonishment and joy, the root burst forth and bloomed into a beauteous dahlia.

METEOROLOGICAL DIARY.

BAROMETER.			THERMOMETER.			WIND AND STATE.		ATMOSPHERE.			WEAT'R.
1854.	8-9a.m in. cts.	10p.m. in. cts.	Min.	Max.	10p.m.	Direction.	Force.	8 a.m.	2 p.m.	10p.m.	
Dec. 22	29.94	29.70	46	52	52	S. West	brisk	cloudy	cloudy	cloudy	dry
23	29.90	29.81	40	46	42	S. West	airy	fine	fine	cloudy	showery
24	29.91	29.87	36	46	44	West.	gentle	fine	cloudy	cloudy	rain
25	29.63	29.80	45	46	43	West.	strong	cloudy	cloudy	cloudy	showery
26	29.82	29.83	38	45	42	S. West	brisk	fine	sun	fine	dry
27	29.83	29.94	34	39	32	West by North	gentle	fine	sun	fine	dry
28	30.35	30.44	29½	37	29½	N. West	gentle	fine	sun	fine	dry
29	30.44	30.45	29	39	39	W. S. W.	gentle	cloudy	sun	cloudy	dry
30	30.45	30.40	39	45	39	West by North	airy	cloudy	fine	fine	dry
31	30.35	30.17	37	43	43	West.	brisk	fine	cloudy	cloudy	rain
1855.											
Jan. 1	30.00	30.01	42	49	49	W. by S.	lively	fine	cloudy	cloudy	rain
2	30.10	30.11	46	48	47	W., N. W.	lively	cloudy	cloudy	cloudy	rain
3	30.16	30.21	45	50	45	N. Westerly	gentle	cloudy	cloudy	fine	dry
4	30.25	30.23	42	46	46	N. Westerly	gentle	cloudy	cloudy	cloudy	dry
5	30.22	30.13	39	48	47	S. West	brisk	cloudy	sun	cloudy	dry
6	30.30	30.40	46	50	48	S. West	gentle	cloudy	cloudy	cloudy	dry
7	30.47	30.50	45	49	45	S. West	gentle	cloudy	cloudy	cloudy	dry
8	30.49	30.40	44	46	44	S. West	gentle	cloudy	cloudy	cloudy	dry
9	30.33	30.42	43	48	42	W., Easterly	various	cloudy	fine	cloudy	drizzle
10	30.50	30.52	36	43	31	East	gentle	cloudy	sun	fine	dry
11	30.52	30.45	24	37	34	E. S. E.	calm	fog	cloudy	cloudy	dry
12	30.51	30.50	34	40	39	E. S. E.	calm	fog	haze	fine	dry
13	30.53	30.46	33	38	36	N. East	gentle	fog	cloudy	cloudy	dry
14	30.45	30.46	33	41	29	North	gentle	cloudy	cloudy	fine	dry
15	30.46	30.26	28	33	31	W. N. W.	gentle	fine	cloudy	fine	snow
16	30.09	30.09	30	36	28	N. West	gentle	fog	cloudy	cloudy	snow
17	30.08	30.09	25	30	27	N., E.N.E.	brisk	fog	sun	fine	snow
18	30.11	30.00	23	36	28	North	gentle	fine	sun	cloudy	snow
19	30.00	29.88	16	28	23	N. East	gentle	haze	sun	fine	dry
20	29.85	29.77	23	32	22	N. East	brisk	cloudy	cloudy	cloudy	drizzle
21	29.81	29.88	20	28	22	S. E. and N. E.	gentle	fine	sun	cloudy	dry

ESTIMATED AVERAGES OF JANUARY.

Barometer.		Thermometer.		
Highest	Lowest.	High.	Low.	Mean.
30.77	28.89	52	11	36.1

REAL AVERAGE TEMPERATURE OF THE PERIOD.

Highest.	Lowest.	Mean.
41.74	35.16	38.45

WEATHER AND PHENOMENA.

Dec. 22, 1854. Turn of days; pretty fine.—23. Fine; change.—24. Drizzle; damp air.—25. Strong south-west wind; damp.—26, 27, and 28. Three fine days.—29. Remarkable height of the barometer.—30 and 31. Change indicated; great excess of temperature all this period.

LUNATION.—Dec. 26th, first quarter, 0 h. 38 m. afternoon.

Jan. 1, 1855. A trifling drizzle.—2. Dirty and drizzle.—3. White fine cumuli in the evening.—4 and 5. More fine and drying.—6. Overcast.—7. Quiet, sober day.—8. Damp and chilly.—9. Fine forenoon.—10. Frosty air.—11. Keen hoar frost; changeable.—12. Fine night.—13. Overcast.—14. The same.—15 to 18. Much snow.—19. Clear, but very keen.—20 and 21.—Snow lies, and more threatens.

LUNATIONS.—Full Moon, Jan. 3., 8 h. 19 m. morning. Last quarter, 11th day, 0 h. 13 m. afternoon. New Moon, 18th day, 8 h. 37 m. forenoon.

REMARKS CONNECTED WITH AGRICULTURE.

Excepting the late fall of snow, which safely protects the wheat, it will be evident that little rain has been registered. The past year was the driest that is on record since the fertile 1847. We now cease to notice our future prospects; they depend upon the meteorology which Providence may ordain. Hitherto all has done well, if we except some of the turnips. Sheep and cattle appear to be extremely healthy.

Croydon, Dec. 22. J. TOWERS.

CALENDAR OF AGRICULTURE.

The ploughing of leys and stubbles will go on during the whole of this month, and often very busily, from being impeded by frosts and snows the previous months. Continue the carting of dung to the fields, earths for composts, and stones for drains. Thrash regularly the fresh straw for cattle, and push forward such operations, that they may not impede the sowing season now approaching. Begin feeding with oil-cake the fattening cattle, and bruised or broken in troughs in the yards and in the fields for sheep. It much hastens fattening, and greatly improves the quality of the dung: oats are very well used with it, and a portion of salt. Ewes will now drop lamb very fast: attend to shelter, and the supply of food. In fine weather, pull, dress, and lay in pits, and remove from all lands, turnips of all kinds for the live stock, that the land may be ready for sowing. Continue the feeding of animals, as directed last month.

Plant during fresh weather on suitable grounds all kinds of forest trees, especially oak, ash, elm, and larch; the second year cut over all sprouting trees close by the ground, to secure a more vigorous growth; and when two or three years grown, cut away all other shoots, leaving the best and most vigorous for a tree. Plant osiers in beds or rows made on low damp grounds, that cannot advantageously be made arable from inundations or similar causes. Lay the beds as dry as possible, and done a year before planting. Cut underwood, and fell timber the whole of this month, and plant new hedges; plash and repair old ones.

Prepare artificial manures of all kinds possible; flood meadows, and if the weather be fine, begin to lay dung on grass lands, rough and straw, and then bush-harrow, and roll, and pick off stones and rubbish in the following dry weather. Begin also to repair gates and fences, to put grass lands into order by spreading tufts of dung and mole-hills, and by removing any obstructions.

Dig hop grounds, open the hills, and apply strong manures; rotten farm-yard dung, composts of lime and salt, rags, and oleaginous substances answer well. Dress the roots, and cut off the shoots for sets.

Continue under-draining and subsoil ploughing, and the thrashing of grains; sell and deliver it.

In early localities, and on dry warm lands, the sowing of crops will begin during this month. Sow early peas on newly-stirred soils, broadcast or by drilling. Sow beans by dibbling, or in ridges, or by drilling on the flat surface. Sow barley on last year's turnip lands with one furrow, and spring vetches mixed with barley, or oats, or beans, for horses and sheep fed. Sow cabbage seeds on warm well-prepared grounds, for plants to go to the field in May or June.

Collect manures, and burn into ashes all substances that can be reduced in that way.

AGRICULTURAL REPORTS.

GENERAL AGRICULTURAL REPORT FOR JANUARY.

During nearly the whole of the month very severe weather has been experienced in nearly all parts of the United Kingdom. It has, however, proved seasonably fine, and the heavy falls of snow have been highly beneficial to the winter wheats. From all quarters our accounts respecting the present position of agricultural affairs are very favourable. All out-door labours are well in their place, the wheats have suffered but little from the ravages of the slug, and the breadth of land under wheat culture is even in excess of the corresponding period last year. Stock is thriving well, with a good supply of food, and prices continue remunerative, notwithstanding that the markets have had a downward tendency.

The corn trade has been less active than in the preceding month, and numerous somewhat heavy fluctuations have taken place in the value of wheat. The most casual observer must admit, that since the close of the last harvest, a great drain has been made upon the new crop of wheat. Its yield was, unquestionably, a large one; but it is a serious question to consider whether it will continue to bear a drain equal to the present during the next three or four months without materially reducing the aggregate supply, and thus have considerable influence upon the quotations. The stocks of foreign grain now on hand are unusually small, and the prospect of future arrivals of magnitude is a very poor one. Possibly, we shall receive small supplies from the westward, including extensive imports of Indian corn from the United States;

MID-KENT.

The extreme mildness of the season, up to the 16th inst., made us rather wish for wintry weather of some sort, as there seemed a danger of the buds of fruit-trees swelling, so as to be injured by hard weather when it did come, which every one seemed to think was sure to follow. However, we have had winter in earnest since then, and with it the usual complaints common at such seasons; but, as my purpose is more to chronicle the past than speculate on the future, I may say that the long period of fine weather we were favoured with, even in the "short, dark days," enabled us to forward work very much, as the light lands were all sufficiently dry to be dug, or otherwise worked; and those of our hop gardens which were sufficiently clear of weeds were firm enough one or two mornings in autumn, by the frosts we had then, to allow their being carted on a few hours in the mornings, and those who took advantage of that, to get on their manure, have had plenty of opportunity since to have them dug; for it must be remembered that a hop garden will only allow carting over it in frosty weather; and when any quantity of groundsel, or other weeds, do exist, they prevent a little frost from acting on such ground; otherwise, these weeds in autumn are not supposed to be detrimental, as they are all dug in, and it is rare indeed that any but annual weeds are seen in a hop garden. However, I may say that a considerable breadth of such gardens has been dug, and the same may be said of some orchards in tillage, although the work of pruning trees and the like renders them generally later than the hop gardens. I may also add, that the fine open weather has favoured work of other kinds as well, while many of the jobs purposely left for bad days have been delayed much beyond their proper time, as, for instance, the roads are in worse order than usual, and all contemplated alterations, in the way of grubbing up old trees or hedges, or making new ones, have been put off with a view to push on the work more commonly done in February. However, winter has set in with us at last, and at the time I write (the 26th) seems so steady as probably to last some time, and we may yet have enough of it ere it leaves us. The fine autumn was of infinite service in the low lands, in the way of enabling our farmers to get in their seed corn in much better condition than usual; and, since then, I have not heard anything against its appearance, and certainly the present snow will not do it any harm; but one of our greatest drawbacks is the unhealthy condition of our sheep, which have done badly this autumn and winter, and many have died. Somehow the mildness of the weather has kept the grass in continuous growth, and the young blades being more acceptable to the sheep than hay and other dry food, they have been purged to an extent that accounts for their poverty. Those on turnips have done better; but the breeding flocks, being mostly on meadow lands, and not much hand fed, they have suffered severely. Some complaints have also reached us that bullocks have done badly; but as these are all tied up and stall-fed, we cannot vouch for the accuracy of that, farther than by saying that some descriptions of oil-cake seem not to contain half the quantity of feeding matter it formerly did. Other things remain about the same. Of the products peculiarly the growth of this district, "hops and fruits," but very few of either remain now in the hands of the growers. The season for the latter being fast spending, and the market prices being tolerably good, most growers cleared out before Christmas. A little advance in the price of hops about that time also induced most of the growers to sell out then; and, as is well known, the quantity was not more than one-third of an average crop, the number of pockets on hand was small, and probably, at the present time, there are fewer hops in Kent than in any other county, those in the hands of merchants and warehousemen excepted. Corn is also anything but plentiful, almost every bushel being sold in this district, except what is wanted for home use, in the way of feeding, &c. The steam-engine has materially assisted to hasten the disappearance of our corn stacks, substituting those of straw in their places; but it is pleasing to see these powerful agents favourites with our workpeople rather than otherwise, for barn work has ceased to be popular with them, and they listen to its booming sound without envy or ill-will. The wet autumn of 1852, which gave a sort of impulse to draining, which that of 1853 in a great measure confirmed, has, however, not been so fully carried out this season; as it is not so manifestly evident to be wanting; some have deferred that important duty till another year. This assuredly is wrong, for the ground, though not saturated to excess, as on these two occasions, is yet liable to be so again without these drains, while the work of putting them in is best performed in a dry season. We have, therefore, put in about one hundred thousand drain pipes in grass land the present winter, and though every branch drain may not constantly run, yet the free egress they will give to heavy rains, and other benefits that will accrue from them, will fully compensate for the expense we have been at in the affair.—Jan. 26.

WEST GLOUCESTERSHIRE.

The great difficulty and inconvenience frequently experienced in getting on to the land, to perform the necessary operations, in consequence of heavy falls of rain, have happily this year been obviated by the unusual dryness which has prevailed; and, up to the end of the first fortnight in January, we were almost led to the expectation that the rigours and emblems of winter were confined to more northern latitudes. Fine, bracing frosts commenced on the 13th; on the 17th there was a slight indication of snow, and the frost continued, but not with great intensity. On the night of the 20th the snow descended more abundantly; it continued falling during a portion of the succeeding day, and at intervals subsequently; but, as it was not accompanied with wind, it has not drifted. Thus, no inconvenience is experienced from that cause. The young wheats, before they were hidden from inspection, looked promising and healthy, and the weather has, since that time, been quite favourable: the frost will check precocious luxuriance, while the snow screens it from intense inclemency; in fact, the arable lands are but slightly penetrated with frost, so kindly does the snow afford protection. The swedes and turnips, where they remain on the land, are arrested from premature vegetation by the same cause, and hitherto, as that vacillating condition of the elements, alternately freezing and thawing, has not been experienced, they have a fair prospect of remaining sound. Should these favourable conditions last, keep will not be scarce, as the root crops will compensate for the short cut of hay last summer. The teams are actively employed in carting out manure, although the land, in many situations, has been in such a favourable state, that it was not delayed for the arrival of the frost. There are not any complaints of disease among stock of any kind; there has not been any inclement weather to affect them. The dairy cows will soon be ready to give forth their produce, and they require attention, much more than is usually bestowed upon them in this district. It is painful to behold the majority of them, managed, or rather mismanaged, as they are. With the snow on the ground, they may be seen gathering the hay thrown in little heaps, or perchance in cribs; but in either case they trample on and destroy as much as they eat. This arises from parsimonious notions of economising labour, and idleness; but, if the farmer would bear this in mind, he would surely adopt a better system:—If thirty cows each destroy half a hundred-weight of hay per week, by trampling it under foot, and it costs 50s. per ton to grow the hay, the amount he loses weekly is £1 17s. 6d. One-third of that sum would be more than sufficient to defray the charge of a man for requisite attendance upon them in the homestead. There are many farmers who have sheds, yet they do not use them, who seem to prefer sending their hay to the cattle, rather than bring their cattle to the hay. The appearance of the animals, be they old or young, where properly housed and attended to, compared with those which are neglected, affords incontrovertible evidence of the advantages which are derived from care; and when the spring is backward, it tells with double effect on dairy cows. The various false reports which have been circulated on the all-engrossing subject, the affairs in the East, have had powerful effects on the grain markets, often occasioning a stagnation in trade. Is it correct? what is to be the ultimate result? how will the markets be ruled? are questions on the lips of every farmer when he enters the market town. But no one can solve the mysteries. The impression prevails, that the price of wheat will not vary materially for some months, and after that, they will be governed by the prospects of the ensuing harvest, unless some very unforeseen event transpires. The thrashing machines are in regular operation, to an extent sufficient to supply the general requirement of straw; and, in some instances, they may be more busily employed to meet present demands for cash; but, as a few loads of wheat realise a fair sum, the farmer of moderate resources is not compelled to draw extensively on the exchequer of his rick-yard. It is extremely gratifying to conclude with a good account of the potatoes in store. There is not a single complaint heard of an unhealthy tuber; the disease seems to have departed from this district, as it were by magic, and we hope never again to make its appearance.—Jan. 26.

REVIEW OF THE CORN TRADE

DURING THE MONTH OF JANUARY.

The month of January opened with great expectations in the corn trade, from a general anticipation that an improvement would immediately take place after we had got into a new year: such, however, did not prove to be the case; for the holidays interfered with business a good deal, private and public stock-taking occupied many parties, and the non-arrival of the long looked-for Baltic fleet also had some influence, keeping buyers aloof; the first week, therefore, passed away without any great extent of business being transacted, or any material variation in the value of either English or foreign wheat. The deliveries from the farmers had however fallen off, there being only 90,641 qrs. returned, at an average of 74s. 3d., against 111,968 qrs. at 73s. 9d., returned the last week in December. Trade was thrown into complete suspense on the 8th of the month by the telegraphic reports from Vienna, that the Emperor of All the Russias had consented to negotiate for peace on the "Four Points" agreed to by the Western Powers, and this had such an effect on the minds of the buyers that all business was nearly stopped in Mark-lane; and after a few parcels of the finest Essex Wheat had been selected out of the runs up for that day's market, at a reduction of fully 2s. per qr., scarcely any other sales could be effected, and the remainder of the supply was left over for future markets; so that the second was not only no better than the first week of the month, but actually much worse, and a market on which less business has been transacted is not often witnessed. The reports from Mark-lane had a paralyzing effect on all the consuming and agricultural markets of the United Kingdom, and a greater decline was submitted to than in town, with, however, a disinclination on the part of the farmers to sell their stocks at the great difference in value required by the buyers, and knowing their position so well, many influential agriculturists refused to follow the downward state of the markets whilst uncertainty still remained as to the question of "Peace or War;" it appeared more like a panic, however, amongst some alarmists; but they could not frighten the stout-hearted, and throughout the country the transactions were not greater in proportion than in town.

In this position of the trade, the third Monday's market of the month arrived, and the supply of English wheat was somewhat large, consisting of a considerable quantity left over from the previous week's arrivals, and the fresh land-carriage samples of the day. The market opened with a somewhat better feeling for business, inasmuch as the millers seemed disposed to make purchases when the factors had consented to a liberal abatement to meet the views of the buyers; and after having accepted a reduction of 4s. to 5s. per qr., some quantity was placed; but some sellers still held a portion of their supply, and the market closed more like an immediate reaction than any further decline in prospect. Up to this period, the imports of foreign had been very trifling, the vessels from the North of Europe being still kept out.

The importers of foreign wheat had not given way so much, from the reduced stocks of fine qualities; but still no description could be sold without a reduction of 4s. to 5s. per qr. being submitted to within the period of this dulness.

The important decline quoted from the metropolis appeared to have had a contrary effect, in all the agricultural districts, to what was expected, and the fiat seems to have gone forth through the length and breadth of the land, "Stop the supplies!" and so the farmers did, and shortened their deliveries immediately, being the more determined on this from the cessation of negotiations at Vienna, and they were at once resolved not to fall into a "ruse" emanating from St. Petersburgh, ostensibly to save Sebastopol.

The Tuesday's markets were generally firmer; those of Wednesday in many instances 1s. to 2s. per qr. dearer; on Thursday a similar advance; on Friday (at Mark-lane) the improvement was 2s. per qr.; and nearly every market held on Saturday was quoted higher, the advance ranging from 2s. to 4s. per qr., according to supply being very limited or fair, none being largely supplied: and the third week thus closed, giving confidence for the future, and encouraging those who had not parted with their stocks to hold with much firmness and follow the course of the markets when they improve—the difference of selling in a brisk and a dull market being well known to every experienced man.

The supply of English wheat at Mark-lane on the fourth Monday of the month was much less than the previous ones, and was short, with very little offering from Lincolnshire and Cambridgeshire by the merchants who deliver by the railways. Predisposed to purchase by the closing firmness of the past week, the town millers bought freely, and had to pay 4s. per qr. over the currency of the previous week, and occasionally for choice samples of white a still greater advance, and nearly recovering all that had been lost by the "Peace-and-plenty" cry, little being left over unsold.

The wind having blown from the north-east for nearly a week, several vessels had arrived from the Baltic with foreign wheat, and although the imports were not large, they had increased to a moderate extent, and nearly a similar improvement in the value of good samples was established; but the extent of business transacted was not large, from the very high rates generally demanded by the importers. Much of the foreign is of last year's growth; and that from the Lower Baltic ports is generally of very poor quality, coming forward in soft condition, and not being such as our millers require for admixture with English, it sells all the more slowly, whilst the most suitable sorts are much reduced in granary, and these are held at extreme rates.

During the week the country markets were a good deal excited by the greatly improved tone of the advices from the metropolis, commencing with Liverpool. Trade there was more firm than brisk; but all the fine qualities of wheat were 3d. to 4d. per 70lbs. dearer. The imports were unimportant, being only 1,372 qrs. of wheat from European ports and 6,916 sacks flour, against 11,737 qrs. of wheat, 26,625 qrs. of Indian corn, and 6,125 sacks and 54,379 brls. of flour in the corresponding week of last year. The stocks at that port were much reduced. On the 1st inst. there were only 27,781 qrs. of wheat, against 149,751 qrs. at the same date last year; and of flour the stocks were only 35,225 sacks and 18,859 brls., against 11,377 sacks and 355,973 brls. last year. Every port in the United Kingdom would come to the same point, were the comparison made, and the consumption is now very large. The imports at Hull were 3,252 qrs. of wheat, 484 qrs. of barley, 3,949 qrs. of oats, 1,939 qrs. of beans, 818 qrs. of peas, and 637 qrs. of tares, with 5,474 qrs. of linseed. Trade was tolerably brisk, both English and foreign wheat being about 4s. per qr. higher; and all the agricultural markets were from 2s. to 5s. per qr. dearer up to the middle of the week, with short deliveries generally. Those later in the week were not so brisk, as it was pretty well known that the Baltic fleet was steadily arriving on the east coast; and up to Friday the imports amounted to about 60,000 qrs. at ports from London to Grangemouth, inclusive, and probably this may be about half the quantity which has been shipped from the Baltic ports and those of the north of Europe. More vessels may yet get in, as the wind is again round to the north-east.

The severity of the weather on the continent will stop further shipments. By advices from Hambro', dated the 23rd instant, it was stated that the river Elbe was full of ice, and all the Baltic ports completely closed by the frost, and that the Sound and Belt were likely to be frozen over, and business must, in consequence, remain dormant until open water. Prices at Danzig were enhanced on receipt of intelligence from Mark-lane of the state of Monday's market; and moderate quality of wheat, 60 to 61lbs., was held at 70s. to 71s. per qr. free on board in spring. At Rostock prices were up to 65s. per qr. for 62lbs. red wheat, and no more vessels would leave that port. There is a fear that the Prussian Government may prohibit the exportation of grain, from a prospect of all being wanted at home, and probably OUT OF GRATITUDE to England for taking so much grain from them for so many years past, now that they fancy we shall want it.

It may not be uninteresting to give here the importations of three leading articles of the trade for the past five years, which will show the immense quantity consumed in Great Britain. They were, for the twelve months ending—

	WHEAT. qrs.	MAIZE. qrs.	FLOUR. cwts.
Oct. 10, 1850	3,513,590	1,463,649	2,855,698
Oct. 10, 1851	4,333,127	1,564,150	6,048,355
Oct. 10, 1852	2,455,542	1,392,741	4,113,794
Oct. 10, 1853	4,847,364	1,881,710	4,494,104
Oct. 10, 1854	4,342,022	1,682,633	4,696,387
Amounting to	19,491,645	7,984,883	22,208,338
And reducing the Flour to Wheat	6,345,239		
Total imports ..	25,836,884		
Or	5,167,377	} annually of Wheat and Flour.	

In the present position of the country and of all parts of the globe, it seems difficult to anticipate from whence we shall get a like importation for the present year. If we turn to the imports of the past four months, they show a great falling off, and stand thus:

Month ending	Wheat. 1854-55. Qrs.	Wheat. 1853-54. Qrs.	Flour. 1854-55. Cwt.	Flour. 1853. Cwt.
Oct. 5	91,247	468,888	90,187	463,545
Nov. 5	75,517	425,866	29,066	302,355
Dec. 5	114,892	411,128	39,264	294,212
Jan. 5	114,687	341,398	97,268	249,085
	396,343	1,647,280	255,785	1,309,197
Decrease on four months, 1854-55..	1,250,937 qrs.		1,053,412 cwt.	

As to a supply from the Black Sea, there is not the least prospect of our getting any for a long time to come; and a strict blockade will commence this 1st February in all the ports, and in those of the Sea of Azoff.

If we turn our attention to the United States, we believe there will be no great quantity to spare from thence; and, at present, prices are too high there to induce any merchants to give orders for shipments to be made as soon as the winter is past. The exports of breadstuffs from America from the 1st September, 1854, were:

	Brls.		Bushs.		Bushs.
Flour ..	70,267	Wheat..	178,501	Maize.	2,819,207
Ditto last year ..	944,174	Ditto last year..	4,270,017	Do. last year.	1,128,225

Of which, during the past two weeks,

	Brls.		Bushs.		Bushs.
Flour....	17,502	Wheat..	87,877	Maize ..	838,070
Ditto last year ..	122,263	Ditto last year..	185,224	Do. last year..	280,500

From these figures it will be shown that the quantity last year was immense, compared with this; and the inference is, that they have little or none to spare of the last crop.

It may be rather different with maize than wheat and flour, as the shipments since last September have been larger than at the same time of the previous year; and this article has sold readily, on arrival at Liverpool, to be exported to Ireland. Last week, the quantity so sent away was 14,010 qrs., whilst there were no imports at all; and for weeks the quantity sold has exceeded the quantity imported; and this demand seems now likely to be extended throughout the season, the article being a greater favourite in Ireland than in any other part of the United Kingdom; and this enables the merchants to ship away their oats to England liberally. Prices now range from 43s. to 46s. per 480lb.—a pretty good rate for the article.

The quantity of wheat sold in the towns making returns has much fallen off during the present month: that ended the 6th inst. was 90,641 qrs., at 74s. 3d.; on the 13th, 99,928 qrs., at 73s. 9d.; on the 20th, 77,711 qrs., at 72s. 2d.; whilst the smallest quantity in any one week of December was 109,071 qrs., at 74s. 4d. per qr.; and the next few weeks will most probably fall off still further. The fact is, with half last year's crop out of the hands of the farmers, they will make short deliveries whenever the markets flatten, and a reduction is attempted by the buyers.

The article of barley has not fluctuated so much as wheat, but there have been changes in its value of a few shillings per qr.: at the opening of the month fine malting qualities brought 37s. to 38s., and these receded about 2s. per qr. towards the middle. Of this description there is only about one-third, the remaining quantity being mostly intermediate and secondary sorts, and these being the most abundant, they gave way at one time 3s. to 4s. per qr.; but grinding samples did not recede so much. Although this grain is considered the cheapest of any—useful qualities being worth about 1s. per stone, whilst wheat commands 2s. per stone, and oats bring about 1s. 3d.—it seems very evident that the war-tax has operated materially against the demand, and the maltsters have worked cautiously, many of them regretting that they have even manufactured so much malt, as the large metropolitan brewers have increased their stocks slowly, and the general opinion is, that the revenue will not have been benefited by the high duty payable this season. The imports of foreign have been of the most trivial character, as well from the north as the south of Europe, and all demands have thus to be supplied principally by the English farmers. On the 22nd the trade revived, and there was a more general disposition to get into stock, both maltsters and distillers taking off a considerable qauntity at an enhancement of 1s. to 2s. per qr. The demand since has been well kept up, and some parties have taken the intermediate qualities off at a safe investment, the wintry weather from the 15th instant having increased the consumption considerably, and probably next month will witness higher prices for this article than have yet been realised since harvest. The deliveries and returns of this grain have been larger than those of wheat every week during the month.

The supplies of oats in the first part of the month were short of the consumption of the metropolis weekly; but the knowledge of many vessels being at sea from the north of Holland kept the large dealers from buying, and the consumers had to pay full prices generally, and now and then rather higher rates; but the deficiency was somewhat made up by some of our large omnibus proprietors having taken to the using of about one-third barley with this article, and found it answer very well, saving them the necessity of giving any beans, and this carried them over to increased supplies, as the third week many vessels got in, and a liberal quantity was then offered for sale, which was increased the following week also liberally, and in this position the large dealers are making an effort to purchase on lower terms, in which they may succeed when the vessels come on demurrage. The stocks in the hands of the factors are much reduced, and those with the dealers are smaller than they were, and the consumption of town being now increased by the meeting of Parliament, there seems more prospect of a little advance than any decline. The prevalence of north-east winds

HOP MARKET.

BOROUGH, MONDAY, Jan. 29.

Our market has continued about the same during the past week, both as to demand and prices. The supply of fine hops is but small; but there appears to be a preference for foreign hops, caused, no doubt, by the lower prices at which they may be purchased.

PRICES OF BUTTER, CHEESE, HAMS, &c.

Butter, per cwt.	s.	s.	*Cheese, per cwt.*	s.	s.
Friesland	114 *to*	116	*Cheshire*	66 *to*	80
Kiel.............	104	112	*Cheddar*	68	80
Dorset	110	116	*Double Gloucester*	60	70
Carlow	100	104	*Single do.* ..	55	66
Waterford	94	100	*Hams, York* ....*new*	80	86
Cork, new	93	100	*Westmoreland*. „	78	82
Limerick	90	96	*Irish* .... „	68	78
Sligo	96	102	*Bacon, Wilts., dried*..	63	68
Fresh, per doz.	14s. 0d.	16s. 0d.	„ *green*....	60	62

ENGLISH BUTTER MARKET.

MONDAY, Jan. 29.

We still note a dull trade in Butter, chiefly owing to an absence of good quality.

Dorset, fine	104*s. to* 106*s. per cwt.*
Do., middling	92*s. to* 94*s.* „
Fresh.	12*s. to* 15*s. per doz.*

BELFAST, (Friday last.)—Butter: Shipping price, 96s. to 106s. per cwt.; firkins and crocks, 10d. to 10¾d. per lb. Bacon, 56s. to 60s.; Hams, prime 70s. to 76s., second quality, 64s. to 66s. per cwt.; prime mess Pork, 92s. 6d. to 95s. per brl.; beef, 105s. to 140s.; Irish Lard, in bladders, 66s. to 70s.; kegs or firkins, 62s. to 64s. per cwt.

Jan. 26.	*Butter. per cwt.*				*Bacon. per cwt.*				*Dried Hams, per cwt.*				*Mess Pork per brl.*			
	s.	*d.*	*s.*	*d.*	*s.*	*d.*	*s.*	*d.*	*s.*	*d.*	*s.*	*d.*	*s.*	*d.*	*s.*	*d.*
1851..	80	0	86	0	58	0	62	0	60	0	63	0	56	0	58	0
1852..	77	0	82	0	38	0	44	0	54	0	60	0	60	0	62	0
1853..	86	0	98	0	54	0	58	0	70	0	74	0	87	0	85	0
1854..	95	0	102	0	58	0	58	0	70	0	74	0	85	0	87	6
1855..	96	0	106	0	56	0	60	0	70	0	76	0	92	6	96	0

GLASGOW, (Wednesday last.)—There was a better supply of cheese than on Wednesday last, viz., 9 carts. Prices remained stationary, and sales were dull. New cheese, 42s. to 48s. per cwt. Skim-milk cheese, 26s. per cwt.

POTATO MARKETS.

SOUTHWARK WATERSIDE.

MONDAY, Jan. 29.

During the past week there have been very few arrivals either coastwise or by rail; still, with what were left from former arrivals, the supply was more than equal to the demand, and in most sorts less money was submitted to. The consumption was never known to be so limited at this season of the year.

The following are this day's quotations:—

	s.	d.		s.	d.
Yorkshire Regents	100	0	to	120	0
East Lothian ditto	100	0	—	110	0
Perth, Fife, Forfar ditto	90	0	—	105	0
Reds and Cups	80	0	—	90	0

BOROUGH AND SPITALFIELDS.

MONDAY, Jan. 29.

We have no arrivals to report either from the Continent or from Ireland. The receipts, coastwise and by land-carriage, are very moderate, and the demand is steady, as follows: Scotch reds, 85s. to 105s.; Scotch Regents, 100s. to 115s.; York Regents, 110s. to 130s.; Lincolnshire do., 105s. to 120s. per ton.

COUNTRY POTATO MARKETS.—YORK, Jan. 20: Potatoes had very slow demand at from 2s. 4d. to 2s. 6d. per bushel; 7d. to 8d. per peck.—LEEDS, Jan. 23: We had a good supply of potatoes. Wholesale 10d., and retail 11d. per 21lbs.—MALTON, Jan. 20: A moderate supply of potatoes sold at from 6d. to 8d.—RICHMOND, Jan. 20: Potatoes, 3s. per bush.—SHEFFIELD, Jan. 23: A fair supply of potatoes sold at from 10s. to 12s. per load of 18 stones.—MANCHESTER, Jan. 23: Potatoes, 8s. 6d. to 13s. per 252lbs.

WOOL MARKETS.

ENGLISH WOOL MARKET.

MONDAY, Jan. 29.

Shearing having commenced in some parts of England, an increase in the supply of English Wool is anticipated. This circumstance, combined with the unfavourable advices from the manufacturing districts, has been productive of considerable inactivity in our market. We have no actual decline to notice in value, yet prices are supported with difficulty.

	s.	d.		s.	d.
Down Tegs.............	1	0	*to*	1	1
Half-breds............	1	0	—	1	0½
Ewes, clothing	0	11	—	1	0
Kent fleeces	1	1	—	0	0
Combing skins	0	11	—	1	0
Flannel wool..........	0	11	—	1	1
Blanket wool	0	9	—	1	0
Leicester fleeces	0	11½	—	1	0½

LEEDS ENGLISH WOOL MARKET, Jan. 26.—Sales of combing wools have been limited to a supply of the immediate wants of the manufacturers, at last week's rates. In clothing wools we do not quote any change in demand. Prices are firm at last week's quotations.

LIVERPOOL WOOL MARKET, JANUARY 27.

SCOTCH WOOL.—There continues a fair demand from the trade for laid Highland at late rates. White is less inquired for. Good Cheviots and crossed are still in good demand at full late rates. Heavy and inferior are much neglected.

		s.	d.		s.	d.
Laid Highland Wool, per 24lbs.	..	9	3	*to*	1	0
White Highland	*do.*	12	6		13	0
Laid Crossed	*do..unwashed*	11	9		12	6
Do.	*do..washed*	12	0		13	6
Laid Cheviot	*do..unwashed*	13	0		14	0
Do.	*do..washed*	15	0		17	6
White Cheviot	*do..do*	22	0		24	0

FOREIGN WOOL.—Since our public sales here on the 17th and 18th inst., when the trade supplied themselves, there has not been much done by private contract; this, however, is more from the want of a good selection of consumable wools, which are scarce, than from want of demand.

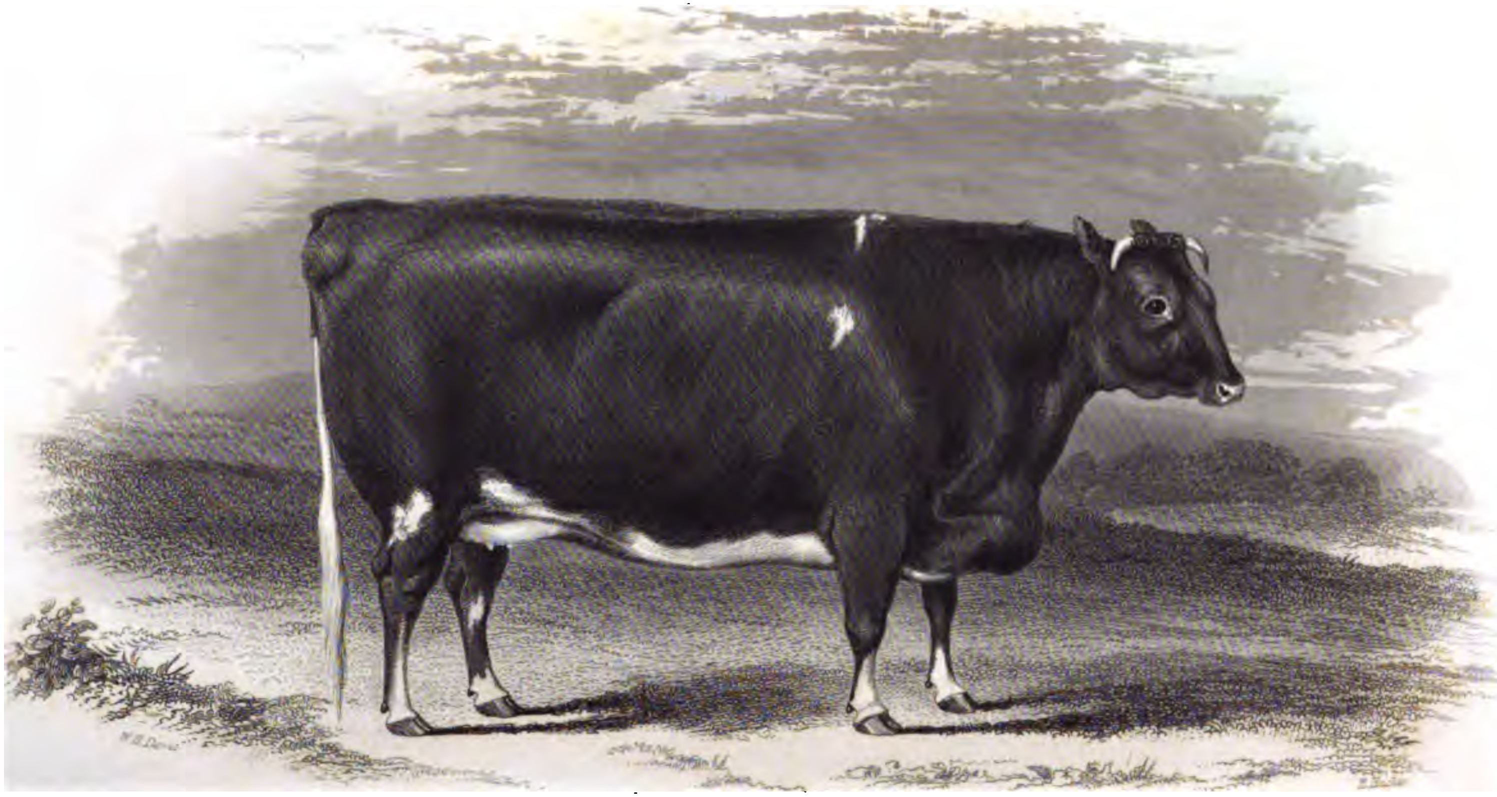
GERMAN WOOL REPORT.—BERLIN,—Jan. 22. During the present month the wool trade has been very animated, and large sales have been effected.—An advertisement in our papers gave notice of a public sale fixed on the 6th of February, of about 800 cwts. of fine Prussian fleeces, which have been several months here in the market, and offered for sale privately. The owner, however, could not get his price for the wool. A few days ago several large buyers came into our market, and, fearing that the competition in a public sale might run the prices for these wools higher than now asked, purchased the whole lot, and of course no auction will take place. This will show that prices are at least as high as last month, and confidence that prices of wool will not go down for some time prevails amongst the people connected with the trade here. Besides the above-mentioned sales, there have been, amongst others, 600 cwts. of fleeces purchased by a comber, and a good deal of wool has changed owners in the town. Only very little has been sold for the English market. The stock of wool in our market is getting very small, and it would be advisable for those who have not laid in a stock of German wool, which will serve them up to the time of the new clip, viz., four months hence, to do it now, as it will be very difficult for them to find that article at a later period. It is not likely that prices of wool will go down; it is rather probable that we shall have higher prices at next summer fairs than now, because no old stock of the raw material will be left on hand. Should the political sky clear up during the next four months, then the prices of wool will probably rise several thalers per cwt. above the present mark. The mild weather has changed here quite suddenly, and a very severe winter has set in. The shipping from Hamburg is stopped by the quantity of ice on the Elbe.—*Leeds Mercury*.

Printed by Rogerson and Tuxford, 246, Strand, London.

F Piercy W H Mote.

Field Marshal Lord Raglan.

London, Published by [illegible] & [illegible] Strand 1855



A Short Horned Heifer.

[illegible]

PLATE V.

PORTRAIT OF FIELD-MARSHAL LORD RAGLAN.

Fitzroy James Henry Somerset, Baron Raglan, of Raglan, in the county of Monmouth, in the peerage of the United Kingdom; G.C.B., P.C., Master-General of the Ordnance, a Lieutenant-General in the army, Colonel of the 53rd regiment of foot, and a Commissioner of the Royal Military College and Royal Military Asylum; was born on the 30th September, 1788; was married on the 6th August, 1814, to Lady Emily Harriet Wellesley-Pole, second daughter of William, third Earl of Mornington.

His Lordship is the eighth and youngest son of Henry, fifth Duke of Beaufort, and great uncle to the present duke.

After many years' important services as Aide-de-Camp to the Duke of Wellington in the field, and subsequently as Military Secretary to two successive Commanders-in-Chief, Lord Fitzroy Somerset was raised to the peerage on being appointed Master-General of the Ordnance; and afterwards, on the breaking out of the war between the Western Powers and Russia, he was created a Field-Marshal, and appointed Commander-in-Chief of the British forces in the Crimea, where his Lordship is now still employed.

The title of Baron Raglan was conferred in 1852; with the motto, that of the Beaufort family, "Mutare vel timere sperno."

PLATE VI.

A SHORT-HORNED HEIFER,

BRED BY AND THE PROPERTY OF MR. JAMES DOUGLAS, OF ATHELSTANEFORD FARM, DREM, EAST LOTHIAN,

For which the First Prize of Fifteen Sovereigns was awarded at the Meeting of the Royal Agricultural Society of England, which was held at Lincoln, in July, 1854.

"Rose of Summer," red, calved May 1st, 1852, got by Velvet Jacket (10998), dam (Rose of Autumn) by Sir Henry (10824), g. d. (Pelerine), by Buckingham (3239), gr. g. d. (Mantilina) by Marcus (2262), — (Maiden) by Matchem (2281), — (Lady) by Alderman (1622), — (Lady Mowbray) by Pilot (496), — (Sylph) by Remus (550), — (Matilda) by Sir Charles (592), — (Alpine) by Mr. R. Son of Colling's Favourite (252), — (Young Strawberry) by Son of Favourite (252), — Strawberry.

THE EFFECT OF LOW TEMPERATURE.

BY CUTHBERT W. JOHNSON, ESQ., F.R.S.

The severe winter through which we have hardly yet passed, naturally enough suggests to us the inquiry as to the general effect of low temperature upon vegetation. In the present season, the temperature during the night has been more than usually low: a self-registering thermometer, at the north side of my house, at Croydon, placed six inches from the wall, indicated very commonly in the last fortnight of January, a temperature of less than 22 of Fahrenheit; on the nights of the 26th and 27th it was as low as 15 or 16 degrees; and on those of the 17th and 18th 11 degress. This temperature was still further diminished in February: on the nights of the 9th and 14th it was at 12 degrees, on the 21st to 10, on those of the 13th and 15th it descended to 8, on that of the 17th to 6, on the nights of the 10th and 18th it was down to 4 degrees.

The great fall of snow with which this low temperature was accompanied, may lead us to examine the chemical observations which have been made as to the composition of snow, and the effect of frost upon plants. The depth of snow often leads to very false conclusions as to the weight of water of which it is formed. Its bulk, in fact, is ten or twelve times greater than the water which it contains. The purity of snow is also generally too highly estimated. In snow, however carefully collected and dissolved, minutely divided mechanically diffused matters will almost always be found; and, as in the case of rain-water, the first portions of a fall are the most impure. The same remark applies to the ammonia which is found in it. Liebig and other chemists have published the results of their labours in this interesting inquiry. The great German chemist tells us (*Organic Chem.*, p. 76), that ammonia may always be detected in snow-water. Crystals of sal ammoniac (muriate of ammonia) were obtained by evaporating in a vessel with muriatic acid several pounds of snow, which were gathered from the surface of the ground in March, when the snow had a depth of 10 inches. Ammonia was set free from these crystals by the addition of hydrate of lime. The inferior layers of snow, which rested upon the ground, contained a quantity decidedly greater than those which formed the surface. It is worthy of observation, adds the professor, that the ammonia contained in rain and snow-water possessed an offensive smell of perspiration and animal excrements—a fact which leaves no doubt as to its origin. If, then, the chemical matters contained in snow-water hardly differ from those of the same weight of rain-water, we cannot attribute to these any of the beneficial effects to vegetation which, by the writers of the olden time, were assigned to snow. We must be content to seek in other effects of snow, or rather, perhaps, in the low temperature at which it occurs, for an explanation of the good results to the farmer commonly assigned to our hard winters. That it protects to a great extent, with its brilliant covering, the farmer's crops from cold drying winds, and from sudden transitions in the temperature of the air, is pretty certain; and when it melts, its water may be obnoxious to certain insects in the soil, from the absence of oxygen gas from it. Fish are said to suffer from being placed in streams of melted snow.

It is probably, however, after all, the low temperature which gives eventually vigour to the plants partially exposed to its influence—I say partially exposed, because, as my readers are well aware, the frost rarely penetrates in England more than a few inches into the soil. On no occasion during the past winter have I noticed the temperature of the earth, at a depth of 18 inches, to be near the freezing point—it has been usually about 35 to 38 degrees. However hard, therefore, the leaves of some plants may be frozen, there is little reason to apprehend that their roots are in a similar condition.

That continued exposure to a low temperature is beneficial to the general vigour of ordinary plants is a conclusion which the husbandman has long since adopted, and the philosopher, not always very successfully, examined. The Surrey gardeners have a saying that when there are deep snows in February, that then there is fruit in the gardens in the following summer. Now the occurrence of these snows of February indicate that the winter is more than commonly lengthened, the low temperature of the season protracted. This effect of the long exposure of the plants of our gardens to a considerable degree of cold, engaged the attention of the first president of the London Horticultural Society, the industrious and ever knowledge-seeking T. A. Knight; and although most of his experiments were carried on in his gardens and green-houses, yet the class of experiments which he usually instituted will still be full of interest to the numerous agricultural readers of this magazine, who are not likely to readily adopt the conclusion of some of our cockney friends, that from an experiment on a small scale it is not possible to obtain useful results. Knight noted (*Selection from papers*, p.p. 90-174) what we do not always remember, that the degree of heat required to put in motion (as in the spring) the sap of a plant is not definite, but depends on that to which the plant had been previously accustomed. Thus, a vine which has grown all the summer in the heat of a stove, will not be made to vegetate in winter by the heat of that stove; but if another plant of the same variety, which has grown in the open air, be at any time introduced, after it has dropped its leaves in the autumn, it will instantly vegetate. This effect he explained by supposing that the latter plant possessed a degree of irritability which has been exhausted in the former by the heat of the stove, but which it will acquire in the winter by being drawn out and exposed for a short time to the autumnal frost. On the same principle we may explain why seedling plants always thrive better in the spring than in the autumn, though the weather may be apparently less favourable. In the spring the stimulus of heat and light is gradually becoming greater than that to which the plant has been accustomed: in the autumn it is becoming gradually less. It appears, then, as Knight on a subsequent occasion observed, that the powers of vegetable life in plants habituated to a low temperature are more easily brought into action than in those of hot climates; or, in other words, that the plants of cold climates are more exciteable; and as every quality in plants becomes hereditary when the causes which first gave existence to those qualities continue to operate, it follows that these seedling offspring have a constant tendency to adapt their habits to any climate in which they are placed. But the influence of climate on the habits of plants will depend less on the aggregate quantity of heat in each climate than on the distribution of it in the different seasons of the year. The aggregate temperature of England, and of those parts of the Russian empire that are under the same parallel of latitude, probably do not differ very considerably; but in Russia the summers are exceedingly hot, and the winters intensely cold; and, moreover, the changes of temperature between the different seasons are sudden and violent. In the spring, great degrees of heat suddenly operate on plants which have been long exposed to intense cold, and in which excitability has accumulated during a long period of almost total inaction, and the progress of vegetation is in consequence extremely rapid. In the climate of England, however, the spring very commonly advances with slow and irregular steps, and only very moderate and gradually increasing degrees of heat act on plants, in which the powers of life have scarcely in any period of the preceding winter been totally inactive. We have several easily remembered instances of these things in the plants around us. The crab is a native of both countries, and has adapted alike its habits to both. The Siberian variety, introduced into the climate of England, retains its habits, expands its leaves, and blossoms on the first approach of spring. It vegetates strongly, in fact, in the same temperature in which the native crab scarcely shows signs of life.

But the influence of a low temperature upon a farm is not confined to the crops—its benefits extend to the soil, in one or two modes of which we are acquainted, and probably in others of which we are as yet ignorant. The ordinary and correct conclusion is that frost pulverizes the soil and destroys the insects which are its tenants. As I have on another occasion observed, the farmer of the heavy adhesive clay soils, which are reduced to a sufficient degree of fineness only by the most laborious exertions, is the man to whose soils the frost affords the most valuable assistance. The water contained in these clays, during its conversion into ice in a low temperature of the atmosphere, expands with a force which nothing can resist. As, therefore, the ice pervades every particle of soil, its expansion, as a natural consequence, reduces very completely the clay into a very finely divided state. The farmers of such soils, therefore, are much befriended by a hard winter, like that with which we are now visited, since the frost readily accomplishes that pulverization of the soil which the plough and the clod-crusher can only very imperfectly and laboriously imitate. The action of frost on many varieties of such soils, it may be here remarked, is most materially aided by the land being *deeply* ploughed, and laid up in higher ridges than are commonly thought necessary. By this plan, the frost penetrates *deeper* into the earth, and thus not only is the soil more thoroughly and deeply pulverized, but the destruction of grubs and other insect vermin is rendered much more extensive and effectual. Many of these, it is well known to the entomologist, retire into the soil as winter approaches, and remain torpid during the intense cold of the season, in places beyond the ordinary depth to which the frost extends. It is, therefore, very desirable that the usual effect of a very low temperature should be facilitated as much as possible.

There is no soil, perhaps, upon which the frost operates more rapidly and completely than upon those composed of chalk. Chalk, when nearly saturated, I find by my own experiments, contains about 23 per cent. of water; and we can hence readily see how it is that when such a large proportion of water is converted into ice, it thus by its expansion so rapidly and effectually pulverizes the chalk spread over the land. It is to this levelling effect of the frost that we may, perhaps, attribute the peculiarly rounded smooth surface commonly possessed by the downs of the chalk formations. These facts explain, too, *why* it is that the farmers who have the most *successfully* practised the excellent system of *chalking*, *marling*, or *claying* light lands, have remarked that this operation never succeeds so well as when the earth is spread over the land, and allowed to remain on the surface exposed to a winter's frost. The essential condition, in fact, to the successful permanent addition to the soil of such dressings is, that the adhesive earths should be so finely divided as to be *intimately combined* with the lighter and more sandy and gravelly soil. If this object is not effected—if the marl or clay is not thus allowed to remain exposed to the action of the frost, and is ploughed in lumps, but little good is derived from their employment. The farmer then tells you that it does no good to the land, it does not *work*, that it remains uncombined with the staple of the soil, and that *it sinks down* into the land. These, therefore, are instances of the success of earthy dressings being entirely prevented by the mere neglect of a due attention to the *mode* and *period* of the year at which this most valuable operation is best performed; and it is to this source that many erroneous statements, and much injury to the more general adoption of one of the most certain modes of permanently improving light lands are owing. The owner of such soils will do well to consider with attention these important facts. The expense of marling or claying, if these earths are conveniently situated, is much less than is commonly believed.

The correctness of the view of the time of claying and marling which we have taken is also supported by the observations of Mr. Charles Burness, of Woburn. He tells us (*Jour. Roy. Agr. Soc.*, vol. iii., p. 233)—"My system has been to put the clay on the clover leys as early as the crop is off, and then to get it broken in pieces as much as possible before it is ploughed in for wheat. I also lay it on the turnip fallows early in the winter, so that it may have the chance of the winter and spring frosts, to get well pulverized before it is ploughed down. This I prefer to claying on clover leys. In January, 1841, I clayed some land, which was going to be a turnip fallow the following summer, and in the month of April, when I began to harrow and plough the land, the clay broke down, and slacked like lime, and worked in with the soil. I did not see much difference that summer in the turnip crop, as the other part of the field was sown at a different time, and I was not able to tell the difference; but this year (1842) the barley looks much stronger and stiffer in the straw, and stands much more upright than on the land which was not clayed. The quantity per acre is generally 50 loads; if more than this is applied, I should recommend it to be done at twice, as, in my opinion, more at once would do harm. The clay may be dug from the pit at any time when most convenient to the farmer, and if turned over once or twice will mix much better with the soil, but will be attended with more expense. My plan has been generally to dig and cart the clay on the field at once." The good effect of thus exposing marl during the winter on the surface of the land has, in fact, long been remarked. Arthur Young, in speaking of the marling of the land at Houghton, the seat of Lord Orford, remarked (*Annals of Agr.*, vol. xii., p. 51), "In marling or claying he has found that the longer it is kept on the surface of a layer, the better; the method he prefers is to spread it on a ley of one or two years old (the latter best), and to leave it for a year."

From observations and reflections such as these, then, we may safely rest assured that even under a snow-covered field are quietly going on extensive and valuable operations, alike beneficial to the crop and to the soil by which it is sustained; and if any train of thought is more refreshing and beneficial to us than another, it is assuredly that which leads us to trace, even among the driving snow and congealing water, the finger of Him who in all seasons blesses our labours, and sustains our hopes of better and brighter harvests.

THE ROYAL VETERINARY COLLEGE, IN ASSOCIATION WITH THE ROYAL AGRICULTURAL SOCIETY.

Do the members of the Royal Agricultural Society of England properly understand their own privileges? Are they fully acquainted with what the payment of that one pound a year entitles, or makes them free to? We are very much inclined to think that a great number of them are not. They duly receive their copies of the Journal, attend occasionally the great country meetings, and rarely look or ask for more. In resting satisfied with this only, they may perhaps be considered as hardly doing justice to themselves. More than this, they are not doing justice to the Society. An institution of this kind requires the general co-operation of those enrolled in it, to render it that efficient organ it should become. In the extent of its practice, and the variety of assistance sought from it, must we look, as we might to that of the individual, for its true position and appreciation.

At what is known as a "Weekly Council" of the Society, held on Wednesday last, a very interesting report was received from the Governors of the Royal Veterinary College. We give in our paper of this day, under the Proceedings of the Society, so much of this as it has been thought fit to publish. It might perhaps have been desirable to have it entire. Still sufficient is afforded us to show how well the members of the Veterinary College have exerted themselves, as how ably they have proved the value of their co-operation with an Agricultural Society. Have the members of the latter done as much? We are afraid not. We must repeat, indeed, in extenuation of this, our belief that thousands of them do not know the attention their wants and inquiries would receive from the Veterinary College. Have they disease spreading amongst their herds and flocks, any serious case threatening the loss of a valuable animal, or any particular one, the features of which should be generally known—where can they apply with so much confidence or satisfaction as to head-quarters? But then the expense—little or nothing. To members of the Royal Agricultural Society there is comparatively no charge for treatment. The transit of a beast in these railway days is a trifle that no sensible man, consulting his own interest, should or would dwell upon. The keep on its arrival —but here the report must speak for itself: "With reference to the admission of cattle, sheep, and pigs into the College Infirmary, when the subjects of disease, the Governors would be much gratified to find that the members of the Society availed themselves of their privileges to a far greater extent than at present. They cannot but think that the small number of animals sent from the country arises from the supposition that the charge for their treatment is more than the proprietor feels justified in incurring. This impression, the Governors believe, will be at once removed when they state that the sum fixed upon for the keep, medical treatment, operations of every kind, and all other necessary things, is but 1s. 6d. a day for a bullock, and that sheep and pigs are charged for at a proportionate sum, which is fixed by the principal according to circumstances."

We have little doubt that if not a total forgetfulness as to the privilege, there has been very generally a wrong impression, which we gladly offer all our aid to remove. There is no inducement the Royal Agricultural Society can hold out that, if only availed of, can tend more directly to benefit the farmer and breeder, than this communion of interest with the Royal Veterinary College.

The report is altogether a very practical and useful one. Addressed, as it should be, especially to the agriculturist, it touches on every point of importance that has lately, or may early promise to affect him. Pleuro-pneumonia, and its proposed preventives or remedies, amongst which inoculation, despite what we are told it has done on the continent, still finds little favour. The new disease amongst lambs, so alarmingly fatal last season, comes next for consideration; though we gather as yet nothing very decisive or satisfactory on its cause and cure. Another strange contagion referred to in the report is not merely a farmer's, but something even more than a national question. It would seem the curses or misfortunes of the Crimea are without limit; or must we here again attribute our ills more to bad management than anything else? It would be difficult to say how much bad treatment, bad housing, bad feeding, and bad usage had to do with the original spread of pleuro-pneumonia. It is only too probable that the disease lately spoken to, as having made its appearance amongst animals intended for the Forces, may trace back to much the same cause. It would have been interesting, if not more decidedly useful, to have seen the table of questions addressed by Professor Simonds to gentlemen of his profession now with the troops. They are announced as "annexed to the report," while the Governors of the College rely on the importance of the information which the replies to them may tend to elicit. The matter, it seems, may more immediately concern us here at home, so that we cannot be too soon or too well prepared. We were unfortunately unable to be present on Wednesday, when no doubt these questions were read over, so that we can give no expression as to what they chiefly referred. It certainly does strike us, however, that they should not have been omitted from those features in the report it was arranged at once to promulgate.

The other topics in this address come more within the business of the Royal Agricultural Society. One here adverted to demonstrates the very happy effects arising from the union between the two institutions. As Veterinary Inspector to the Agricultural Society of England, Professor Simonds has had opportunities which certainly no veterinary surgeon ever enjoyed before. The highest compliment we can pay him is to say, as we believe we very justly may, that he has made the most of these opportunities. He has directed his researches into a channel where, above all, further research was needed; and has been thus enabled to meet and correct an abuse that otherwise it is impossible to say how systematically might have extended. When the so-called Running Rein finished first for the Derby, it was very pertinently asked—"How many four-year-olds had won the Derby before then?" We wonder how many animals over-age have been entered at our agricultural meetings? "There are too many reasons to believe," says the Report, "that the reprehensible practice of sending animals of an improper age has prevailed to a great extent." With the pig this has been especially the case, and even very lately too. In the pig, however, Mr. Simonds is particularly strong, and his recent discoveries at Lincoln, Birmingham, and elsewhere will, we have no doubt, act as the "well-timed check" anticipated.

"The Age of the Ox, Sheep, and Pig" is a work that will always be an authority. Notwithstanding its re-appearance in the new number of the Society's Journal, we hope there may be no reason to regret the publication so sensibly determined on at the conclusion of those lectures of which it consists. We have had it now for some time awaiting a favourable opportunity for that notice and recommendation which we can here most cordially give it. But little impeded by that common fault—a display of too much technical language or professional lore—the style of the book comes well home to those to whom it was originally addressed. The industry of its author has been great indeed, while the result is proportionately gratifying. We have only, in fact, one complaint to make. Speaking, as he now well may, on his own experience, it does strike us that Professor Simonds might have alluded with a better grace to those writers who have preceded him. Towards the late Mr. Youatt, especially, we should have wished to have seen the expression of a little more kindly feeling. Though without some of the opportunities of the Professor, Mr. Youatt's works on domestic animals will always be valued and appreciated. This lamented gentleman was the pioneer where others only have followed; and we must say, we are pleased to correct an impression that might otherwise tend to do so much injustice to the memory of a good, an upright, and highly-talented man. His works on the horse, the ox, the sheep, and the pig, speak for themselves; and we can only repeat our regret that a brother member of his profession has shown so little inclination to acknowledge the worth of them and their author. The very differences here made out between him and his successor may be not so great, or the one so very wrong, after all. The common charge against Mr. Youatt is that he does not perfect the dentition of animals so early as it really takes place; in other words, that Professor Simonds arrives at this earlier. Now, the Professor's data are chiefly derived from the exhibitions of the Royal Agricultural Society, while the grand object of those meetings has been to bring stock to early maturity. We need not say how amply they have succeeded. Surely, then, this early development may account, in some degree at least, for early dentition. The Professor himself indirectly admits as much. The teeth of an animal, moreover, are by no means the foundation of a rule without an exception. On the contrary, "variations do exist," as the close observation of Mr. Simonds has discovered. Uniting with this close observation those additional advantages for its employment, he has furnished us with a very excellent and much-required work. He could, so, have the better afforded to have made every allowance for those whose opportunities had not been equal to his own. —Mark Lane Express.

ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

A Monthly Council was held at the Society's House in Hanover-square, on Wednesday, the 7th of February; present, Mr. Miles (of Leigh Court), M.P., President, in the Chair, Earl of Yarborough, Lord Berners, Lord Southampton, Hon. A. Leslie Melville, Sir John V. B. Johnstone, Bart., M.P., Mr. Raymond Barker, Mr. Barnett, Mr. Barthropp, Mr. Cavendish, Col. Challoner, Mr. Druce, Mr. Garrett, Mr. Brandreth Gibbs, Mr. Fisher Hobbs, Mr. Hoskyns, Mr. Hudson (Castleacre), Mr. Lawes, Mr. Lawrence, Mr. Marshall, M.P., Mr. Milward, Mr. Sillifant, Professor Simonds, Mr. Simpson, Mr. Thompson (Kirby Hall), and Professor Way.

The following new Members have been elected:—

Alderman, Rev. F. C., Kintbury, Hungerford, Berks.
Arista, General Don Mariano, late President of Mexico
Bancks, James, Prebendal House, Thame, Oxon.
Barstow, Charles Duffin, Garrow Hill, York
Barton, John, Cherlton, Nantwich, Cheshire
Bassett, Richard, Bonvilstone, Cardiff, Glamorganshire
Braby, James, Maybanks, Rudgwick, Horsham
Bradbury, Thomas Swanwick, Winsford, Cheshire
Beddoe, Henry Childe, Priory Lodge, Hereford
Beddoe, George, Lickhill, Stourport, Worcestershire
Bell, Daniel, Hollings, Whitehaven, Cumberland
Brace, George, Russell-square, London
Broughton, Edward Delves, Westaston, Crewe, Cheshire

Broomfield, Thomas, Lauder, Scotland
Browne, R. P., Great Hallingbury, Bishop's Stortford
Budd, Thomas William, Norfolk Crescent, Hyde Park, London
Campion, Rowland, Old-Town, Shanballymore, Co. Cork
Camps, Dr. William, Park-street, Grosvenor-square, London
Cawley, Thomas, Nantwich, Cheshire
Chandler, W. B., Bloomville Hall, Woodbridge, Suffolk
Chandos, Marquis of, M.P., Wotton, Buckinghamshire
Child, Thomas, Shinfold, Horsham, Sussex
Cook, Edward, sen., Holton Hall, Dedham, Essex
Cooke, Henry, High-street, Hereford
Cutts, John, Little Bardfield Hall, Braintree, Essex
Deane, Rev. Henry, Gillingham, Dorsetshire
De la Trehonnais, R. T., Falmouth, Cornwall
Devas, William, Woodside, near Windsor
Ducane, Charles, Braxted Lodge, Witham, Essex
Francis, Frederick, New Place, Upminster, Essex
Garner, Thomas, Wasperton House, Warwick
George, Josiah, jun., Romsey, Hampshire
Girdwood, James, Chirk, Denbighshire
Gower, Erasmus, Clyndarwn, Narberth, Pembrokeshire
Greaty, Charles, Warmingham, Middlewich, Cheshire
Hale, Charles Cholmeley, King's-Walden, Hertfordshire
Halse, John C., Pulworthy, Molland, Southmolton
Hill, Richard, Golding Hall, Acton-Burnell, Salop
Hull, F. Robert, Staley Hill, Staleybridge, Cheshire
Jefferson, Robert, Preston-Hows, Whitehaven
King, George, Saffron Walden, Essex
Legg, Thomas, Burton-Bradstock, Bridport, Somerset
Linton, William, Sheriff-Hutton, York
Lucas, George, Filby, Great Yarmouth, Norfolk
Lynce, Charles, R.N., Newport, Monmouthshire
Michell, John, Forcett Park, Darlington
Morley, John, Cotgrave, Nottingham
Morrow, Hugh, Caraboola House, Co. Longford
Munn, Capt. William Augustus, Throwley Ho., Feversham
Parr, Samuel, Nottingham
Reynell, Richard Winter, Killynon, Mullingar, Ireland
Ricardo, Mortimer, Kiddington Park, Oxfordshire
Rising, Robert, Horsey, Great Yarmouth, Norfolk
Rowland, Col. George T., Mayfield, Sussex
Roberts, James, Overbury, Tewkesbury, Gloucestershire
Rose, Philip, 3, Park-street, Westminster
Saunders, Henry, Ramsey, Huntingdonshire
Sevin, Charles, 11, Cullum-street, City, London
Sharpe, Richard, Highworth, Wiltshire
Simpson, Alexander, Teawig, Bauly, Inverness
Simpson, E. Thornhill, Wakefield, Yorkshire
Smith, Peter, Field House, Bisby, Gloucester
Thompson, Matthew, Kirkby-Stephen, Westmoreland
Trehane, William S., Stockadon Villa, Plymouth
Waddington, Alexander, Usk, Monmouthshire
Waters, Robert, Sarnau, Carmarthen
Watkins, W. Bradley, Cardiff, Glamorganshire
Watson, Robert Harrison, Bolton Park, Wigton, Cumb.
Whidley, James W., Yaldham, Wrotham, Kent
Whittaker, Samuel, Worsley, Manchester
Williams, John, Tynycelyn, Chirk, Denbighshire
Willingham, John, Eccles, Attleborough, Norfolk
Wilkinson, John, Farms, Middlesbro'-on-Tees
Wood, John, Stanwick Park, Darlington
Wratislaw, Charles Edward, M.A., Rugby, Warwickshire.

FINANCES.—Mr. Raymond Barker, chairman of the Finance Committee, reported the current cash-balance in the hands of the bankers, at the end of the previous month, as £3,818. He informed the Council that this balance included a subscription of £1,400 from the authorities of Carlisle, towards the expenses of the ensuing country meeting of the Society to be held in that city. He laid on the table, for the information of the members, the various quarterly statements of account connected with the different financial departments of the Society.

IMPLEMENTS AND MACHINERY.—Col. Challoner, chairman of the Implement Committee, submitted to the Council the report of that committee, which had reference principally to the following points :—

1. The recommendation of implement and machinery prizes for the Carlisle Meeting, similar to those offered at Lincoln, with the following alterations :—

(1.) That the deep ploughing should be required at a depth of 9 instead of 10 inches.

(2.) That the prize for the best liquid-manure or water-drill should be raised from £5 to £10.

(3.) That the prize for the best reaper should be raised from £20 to £30; and that an additional prize of £20 should be offered for the second best reaper.

(4.) That the horse-power for the fixed steam-engines should be reduced from ten to eight-horse power.

(5.) That instead of the former prize of £5 for the best corn-dressing machine, a prize of the same amount should be offered for the best machine to "dress corn for market after it has been screened or riddled."

2. The recommendation of the following new conditions affecting the construction and trial of implements :—

(1.) That in adjudicating on the award of the prize of £200 at the Carlisle Meeting for the "steam cultivator that shall in the most efficient manner turn the soil, and be an economical substitute for the plough or the spade," the attention of the Judges be particularly called to the terms in which this prize is offered.

(2.) That in adjudicating on the award of the prizes for reapers, the attention of the Judges be particularly called to the best mode of delivery.

(3.) That in portable steam-engines worked on the expansive principle, the condition under which the steam is cut off shall not restrict the makers, as last year, to "a lap on the common slide," but simply to the employment of "no complicated means" for effecting that object.

(4.) That the greatest attention be paid by the Mechanical Judges to the plans and specifications of the boiler and fittings proposed to be supplied by the winners of the fixed steam-engine prizes to their respective customers.

(5.) That, in the case of the thrashing-machines, the greatest attention by paid by the Judges to the state of the Barley after it has been thrashed (as to injury more or less, or otherwise, of the grain, after such operation).

3. The recommendation of the following special objects :—

(1.) That, in future reports of the exhibition and trial of implements and machinery at the Country Meetings, published annually in the Journal, it be suggested to the Journal committee, that the drawings and specifications should be given of the boilers proposed for the two prize fixed steam-engines; in order that the purchaser of either of those engines may be enabled to ascertain that the implement-maker supplies to him a proper boiler, similar to the one exhibited in his original drawings, and which the judges had included in their award, as an essential condition affecting the completeness and general value of the engine.

(2.) The recommendation that the Council should place at the disposal of the Implement Committee the sum of £115 for the purchase (at prime cost) of the Dynamometer for thrashing-machines, invented by Mr. Amos, and employed by him with so much success at the Lincoln Meeting; and a sum not exceeding £20 for rendering the present three friction-breaks of the Society, for testing steam-engines, self-acting and independent of special calculation—the adoption of these new arrangements not only superseding the employment and expense of a breaks-man, but effecting a saving of one day's time in the trials.

The Council confirmed and adopted this report.

Carlisle Meeting.—Mr. Milward, Chairman of the General Carlisle Committee, held that day, submitted to the Council the report of that Committee, which had reference principally to the following points:—

1. The election of Mr. Fisher Hobbs, as Vice-Chairman of the Committee.
2. The settlement of the date for the Carlisle Meeting, as the week commencing Monday, the 23d of July.
3. The suggestion that a pavilion should be constructed at Carlisle for the purpose of accommodating 800 guests at dinner, at four o'clock on the Thursday of the week of meeting.
4. The request to Mr. Brandreth Gibbs, that, as Honorary Director of the Show, he would prepare as usual the preliminary plans for the respective show-yards at Carlisle.
5. The request to the Stewards of Implements that they would purchase the requisite amount of Barley and Wheat in the straw, for the purposes of the trial of agricultural machinery.
6. The adoption of the same schedule for Prizes and conditions of show for Farm Poultry, at Carlisle, as at Lincoln last year.
7. The acceptanee, with thanks, of the following Special Prizes, to be competed for at the Carlisle Meeting under the general regulations of the Society.
   (1.) From the Carlisle Local Committee: 75*l.* for Cheviot Sheep, and 80*l.* for horses.
   (2.) From George Head Head, Esq.: 100*l.* for Galloway Cattle.
   (3.) From Robert Ferguson, Esq., Mayor of Carlisle: two pieces of plate, one of the value of 40*l.*, for the best thorough-bred stallion, and another of the value of 30*l.* for the best coaching stallion.

The Council confirmed and adopted this report.

Steward of Cattle-yard.—On the motion of Mr. Simpson, seconded by Mr. Barnett, Sir Stafford Northcote, Bart., was appointed one of the Stewards of the Cattle-yard at the Country Meetings of the Society.

Foreman of Field.—On the motion of Mr. Thompson, seconded by Mr. Hoskyns, power was given to the Implement Stewards, at the Country Meetings, to elect a Foreman of the Field, at such a rate of payment for his services as the Council may decide.

Important communications from the Earl of Clarendon, on the discovery of supplies of guano, were referred to the consideration of the President.—The annual report of the Royal Veterinary College was referred, with various other papers, to the weekly meetings of the Council, at which all members of the Society have the privilege of being present.

The Council adjourned to Wednesday, the 14th Feb., at 12 o'clock.

A **Weekly Council** was held at the Society's house in Hanover-square, on Wednesday, the 14th of February: present—Mr. **Fisher Hobbs**, in the Chair; Mr. B. Almack, Mr. Raymond Barker, Mr. Caird, Dr. Calvert, Mr. Deere, Mr. Devas, Mr. Dyer, Mr. Gadesden, Mr. Brandreth Gibbs, Rev. L. Vernon Harcourt, Mr. Majendie, Mr. Manning, Mr. T. Scott, and Professor Simonds.

Veterinary College.—The Annual Report made by the Governors of the Royal Veterinary College to the Council was read. The following portions are selected on account of their general interest:—

1. **Pleuro-pneumonia.**—Although the cattle throughout the country suffered in this as in previous years from the episootic affection pleuro-pneumonia, still the losses have been by no means so great as on former occasions. The nature of this disease, when it becomes fully established in the system, is such that it will ever render ineffective the best curative measures which science can devise; but, notwithstanding this, there are many reasons for believing that preventive means may be had recourse to with decided benefit. From investigations made by their Professor, during the past year, the Governors have no reason to alter the opinion expressed in a former report, that the inoculation of cattle will prove neither a safe nor an effectual preventive of pleuro-pneumonia. This system of inoculation is not based upon any known principle of medical science which regulates the *artificial* production of a disease to give immunity to an animal against a *natural* attack of the same malady. The Governors are induced to make these remarks from observing that attempts are again being made to introduce the system of inoculation, under the plea that it has proved highly advantageous in numerous instances on the Continent, and therefore it continues to be practised in France, Belgium, and Germany. With regard to the true principles of preventing the extension of pleuro-pneumonia, it cannot be doubted that these will be found in removing the diseased animals from the healthy, in altering the system of management and feeding which was in use when the malady first appeared, and in exhibiting to the animals which had been exposed to the contagion mild aperient, diuretic and diaphoretic medicine, in succession, to rouse the emunctories of the body, and following up these remedies by tonic and stimulating agents to invigorate the vital forces. This plan has been adopted in numerous instances with the best results, many animals being thereby saved which otherwise would have been sacrificed to the disease.

2. **Disease in Lambs.**—On the subject of episootics the Governors have to remark that in the spring of last year a malignant form of aphtha appeared in several districts among the lambs, and destroyed very many of these animals. From this affection having been observed in a comparatively mild form the year before, in a few isolated cases only, and from its great prevalency as well as malignancy in 1854, it is to be feared that it may take on the character of an episootic, and thus add another to the list of those diseases which have been

so destructive of late to our cattle and sheep. Numerous letters have been received from the members of the Society, detailing the progress of this disease, and the great losses which they had sustained thereby. Professor Simonds has also personally investigated the causes which appear to favour the production of the malady; but much still remains to be done, as in consequence of the disease having shown itself under the most opposite circumstances of breed, age, vicissitudes of weather, locality, plan of management, &c., the evidence obtained is most conflicting. The Governors have, however, every reason to believe that the mystery which envelopes the secondary causes of this affection will vanish before a rigid and scientific research. In the meantime they have much pleasure in stating that the recommendations of their Professor with regard to the treatment of the animals, and which were necessarily varied in many cases from the differences in the predisposing causes, have been attended with a satisfactory result.

3. Poisonous Oilcake.—Attention has recently been called to the injury done to the feeders of cattle by the manufacture of an impure oilcake, by which the lives of their cattle were often placed in jeopardy. This important matter, it will be remembered, was brought before the Council in consequence of some cows having been poisoned in the county of York from being fed with cake made from Mustard-seed, and sold as a cheap feeding material, as well as an energetic manure when applied to the land. The publicity given to the subject excited the most lively interest, and there is every reason to believe that the pernicious practice has received a well-timed check.

4. Dentition of Ox, Sheep, and Pigs.—The Governors would next call attention to the labours of their Professor, as Veterinary Inspector to the Society, in investigating the progress of dentition in the ox, sheep, and pig, with a view to a correct understanding of the ages of these animals as shown by their teeth. The facts arrived at from a careful examination of the animals exhibited at the Windsor, Lewes, and Gloucester meetings, were brought before the Society in two lectures delivered by the Professor in May last. So highly were these lectures appreciated, that the Council at its first meeting in June unanimously resolved, on the motion of Mr. Fisher Hobbs, "that on account of the immediate practical importance of the two lectures recently delivered before the Society by Professor Simonds on the age of animals as shown by their teeth, these lectures be at once prepared for publication in the second part of the Journal for this year; but as that number will not be due till the 1st of January next, that Professor Simonds be allowed to print off from the type and woodcuts as many copies as he may require, for the purpose of publishing the lectures in the form of a pamphlet, at a cheap rate, in time for purchase by the public at the Lincoln meeting." In accordance with this resolution, the matter was prepared for the press, and was in the hands of the members by the time appointed. The Governors have the pleasure of adding that, although the sale of the work has as yet been limited, owing to the fact of the matter it contains being about to appear in the forthcoming number of the Journal, still it has been spoken of in high terms of commendation by those who have made themselves acquainted with its details. The facts arrived at with regard to the age of the pig, in particular, have already been of essential service, not only to the Royal Agricultural Society at its meeting at Lincoln, where many animals were detected as being much above the certified age, but also at the recent shows of the Smithfield Cattle Club and the Birmingham Cattle Society. The reprehensible practice of sending animals of improper age, and which there are too many reasons to believe has prevailed to a great extent with a view to carry off the prizes, has thus received a salutary check.

5. College Privileges and Promotion of Veterinary Science.—The consultations by letter on the diseases of cattle and sheep have been fully as numerous as in former years, and the recommendations for the treatment of the several cases have been duly appreciated by the members seeking advice. With reference to the admission of cattle, sheep, and pigs into the College Infirmary when the subjects of disease, the Governors would be much gratified to find that the members of the Society availed themselves of their privileges to a far greater extent than at present. They cannot but think that the small number of animals sent from the country arises from the supposition that the charge for their treatment is more than the proprietor feels justified in incurring. This impression the Governors believe will be at once removed when they state that the sum fixed upon for the keep, medical treatment, operations of every kind, and all other necessary things, is but 1s. 6d. a day for a bullock, and that sheep and pigs are charged for at a proportionate sum, which is fixed by the principal according to circumstances. The average number, however, of diseased cattle has been admitted into the infirmary during the year; but the Governors not finding among them any remarkable cases calling for especial description, have thought it unnecessary to add to the length of this report by a detail of particulars. They would, however, remark that these cases have afforded their Professor the opportunity of giving clinical instructions to the Class, and of demonstrating several of the operations necessary to the success of the practice of Cattle Medicine. During the session the Lectures have been regularly delivered as heretofore, and the attendance of the pupils has been most satisfactory. The class has also been more numerous than in former years; and the progress of the pupils in their studies, as shown by the examinations to which they have been subjected from time to time, has been such as to merit the approbation of the professors in general.

The Council having received at their last December meeting a communication from the French Government, requesting the aid of the Society in investigating the nature of a disease which had made its appearance in Turkey among the cattle intended for the Crimea, the Council at once instructed Prof. Simonds, as the Veterinary-Inspector of the Society, to place himself in immediate communication with M. Herbet, the Consul-General of France in London, and to furnish him with every information he possessed that might aid the French Government in their inquiry. The Report of the Governors of the Veterinary College contains the following reference to that circumstance:—

6. Contagious Typhus.—As a preliminary step, and with the sanction of the Consul-General, Prof. Simonds has prepared a list of questions to be forwarded to the several veterinary surgeons now with their regiments in the Crimea. These questions are annexed to this report, and the Governors trust that the Society will agree with them in the opinion that on answers being obtained, such an amount of information will be possessed on this subject as cannot fail, when acted upon, to be of essential service in effecting the desired object. It is likewise to be remembered that the history of these epizootic affections shows that when once they have taken root in any of the countries of Europe, they have spread with greater or lesser rapidity over the whole Continent,

destroying the cattle by thousands in their course. It is this circumstance, added to the fact of the existence of the disease in Turkey, which has created so much solicitude on the part of the French Government, and the Governors cannot but feel equally anxious in the matter, seeing that if the cattle in France or Germany should become affected, our own would ere long fall victims to the direful pest, from the free importations of animals which now exist.

The report is concluded with the following—

7. General Observation.—The Governors thus hope that, without their calling attention to every circumstance which has transpired since their last report, they have said sufficient to show to the Society that they have endeavoured to promote the advancement of veterinary science in its application to those animals which constitute so essential a portion of the wealth of the agriculturists. These efforts, they believe, only require to be continued to accomplish all which the most sanguine minds could wish to arise from the firm union which now exists between the Royal Agricultural Society of England and the Royal Veterinary College.

On the motion of Mr. Brandreth Gibbs, the Council accepted this report with their best acknowledgments to the Royal Veterinary College, and their high sense of the value of Prof. Simonds' zealous exertions to carry out the objects of the Society in the application of veterinary science to the diseases of domesticated animals.—The Chairman considered Prof. Simonds's work on the Dentition of Animals a valuable hand-book, which ought to be in the possession of every farmer.—Prof. Simonds, in acknowledging the vote of thanks to the college, and the compliment paid to himself, expressed his regret that the members of the Society did not avail themselves to a greater extent of the privilege they possessed of sending diseased animals to the college. Such supply of living and dead animals would lead to investigations of the highest importance connected with the nature of the diseases affecting the live stock of the farmer, and perfect the pupils about to be sent out into different parts of the country in that branch of their instruction.

Miscellaneous Communications. — Mr. Mac Owen on the Lung Disorder among Cattle.—Mr. Beddoes on the Nature of Fibres stopping Drain Pipes.—Mr. Graburn on the Value of Cock's-foot Grass.—Mr. Johnson, of New York, on President Jefferson's Communication to the Board of Agriculture on Mould-board.—Messrs. Dawe and Co., on Specimens of Wheat.—Mr. Trench on Employment of Guano and Super-phosphate.—Mr. Miallemiss on the low State of Agricultural Practice in South Australia, and the Formation of an Agricultural Society at Geelong.—M. Van Langenhove on Quincunx System of Cultivation.—Mr. Burcham on Circular System of Cultivation.—Mr. Cogan's Supply of Specimens of the original German Milk-pans from Mecklenburg.—Mr. Chandos Wren Hoskyns presented copies of his works, "Talpa, or Chronicles of a Clay Farm," and a "Short Inquiry into the History of Agriculture," for which the Council ordered their best thanks.—Mr. Caird expressed his opinion of the importance of the investigations in the course of progress by the Foreign Office in reference to the discovery of supplies of Guano and the nitrates. He remarked, that the bar-harbour of Tampico, as alluded to by the British Consul (in his despatch published in the Society's last Journal) as unfit for the export of nitrates, was not more so than that of Riga, Revel, and Archangel, which are also bar-harbours to an equal extent.

The Council adjourned to Feb. 21.

A Weekly Council was held on the 21st of February—present, Mr. Miles, M.P.; Lord Berners, Mr. Raymond Barker, Mr. Caird, Dr. Calvert, Colonel Challoner, Mr. James Chapman, Mr. Deere, Mr. Devas, Mr. Girdwood, Rev. T. C. James, Mr. Pocock, Mr. Scott, Prof. Simonds, and Prof. Way.

Oil for Machinery.—Mr. Brotherton, of Wandsworth, called the attention of the Council to the economy and value of Rape oil, as a substitute for olive oil, for the purpose of lubricating the moveable parts of machinery; and to the consequent importance of the cultivation of Rape in this country as an agricultural crop.—Prof. Way suspected that the sulphur contained in the seeds of that plant might have an injurious effect on the metallic surfaces under friction to which the oil was applied.—Dr. Calvert had understood that some of the animal oils had been employed with success for the purpose stated by Mr. Brotherton.—Colonel Challoner referred to the freezing process practised by the Geneva watchmakers, by which the solid and impure matters of vegetable oil were separated from the pure oil, which resisted the effect of cold even at very low temperatures, and which was accordingly highly valued by them for the delicate purposes of their watch machinery.—Prof. Way referred to the separation of paraffine in the distillation of coal tar, and to the separation of solid stearine from vegetable oils and the thin oily matter left behind in a liquid state. The great object was to obtain a pure oil least subject to oxidation by friction.—Mr. Girdwood thought that the difference in price between Rape-oil and sperm-oil was so great that any successful substitution of the former for the latter was well worth attention.

Planting of Grain.—Messrs. Hardy and Son, of Maldon, transmitted a tabulated statement of their experience in the sowing of Wheat and other grain, with the following conclusion deduced by themselves:—

> "We are fully persuaded, from repeated experiments, that the greatest possible amount of grain can only be attained from the standard of 1 foot apart square, from plant to plant; and that the surest and best plan to effect that object is by sowing it early, and transplanting it in autumn."

Nitrates.—The Board of Agriculture at Berlin applied, through the Prussian Consul-General in London, for detailed information on the locality, occurrence, preparation, freight, price in comparison with other manures, probability of reduction in price, and other facts connected with the commercial value and agricultural use of the Nitrates of Soda and Potash; requesting the favour of the Council's transmitting to the Board those volumes of the Journal of the Society containing information on the subject.—The Council ordered the Journals to be presented to the Board as requested, and an intimation to be given of the sources of commercial information referring to the nitrates;

but the President regretted that, until the present investigations so kindly undertaken for the Society by the Earl of Clarendon were completed, the detailed information required by the Prussian Board of Agriculture could not be supplied in a complete state.

The President gave notice that, at the next meeting, Mr. Jonathan Gray's model of a great improvement in the construction of shedding (on the span-tension and tent principle), both for implements and cattle, would be exhibited to the members.—Mr. Scott, of 5, Charing Cross, transmitted information on Fowler's Steam-draining Plough, with a statement that the severe winter-weather had not been found in the slightest degree to interrupt the operation of that plough.—The Bavarian Agricultural Society transmitted an account of their latest proceedings.—Mr. Cox, of 68, New Bond-street, presented a copy of his "Landlords' and Tenants' Guide."

Adjourned to Wednesday, Feb. 28th, at 12 o'clock.

AGRICULTURAL STATISTICS OF SCOTLAND.

GROSS PRODUCE PER COUNTY.

	Wheat.	Barley.	Oats.	Bere or Bigg.	Beans.	Turnips.	Potatoes.
	Bushels.	Bushels.	Bushels.	Bushels.	Bushels.	Tons.	Tons.
1. Aberdeen	91,035	303,149	6,170,638	204,925	11,096	1,205,[illegible]56	89,643
2. Argyll	7,315	56,795	866,395	63,144	12,147	84,907	10,801
3. Ayr	818,950	25,880	2,553,671	8,038	98,924	221,314	27,675
4. Banff	29,640	160,267	1,599,235	30,192	4,559	250,406	7,702
5. Berwick	392,603	690,916	1,315,575	1,273	47,187	403,067	9,935
6. Bute	23,776	11,652	152,656	7,086	4,512	94,009	2,264
7. Caithness	4,614	9,549	748,215	98,921	—	113,416	8,310
8. Clackmannan	59,189	62,568	147,800	—	38,484	26,564	803
9. Dumbarton	49,440	47,503	330,084	485	17,246	37,502	9,000
10. Dumfries	75,148	93,490	1,638,095	616	16,260	249,336	21,711
11. Edinburgh	262,128	454,116	568,376	1,582	48,468	215,763	26,212
12. Elgin	203 871	334,373	595,266	10,408	1,856	140,279	9,094
13. Fife	697,252	1,075,603	1,656,467	540	111,052	405,145	63,087
14. Forfar	380,658	918,010	2,001,583	7,611	91,037	417,304	51,998
15. Haddington	510,200	565,033	752,929	1,471	104,089	228,509	33,821
16. Inverness	47,573	93,100	437,584	23,068	2,573	84,984	6,519
17. Kincardine	72,137	302,860	1,244,304	24,752	16,497	225,228	12,169
18. Kinross	13,895	94,879	284,081	804	3,724	67,717	3,216
19. Kirkcudbright	49 276	60,062	1,008,887	9-6	14,149	212,630	8,372
20. Lanark	209,324	80,158	1,936,027	8,537	108,336	160,564	34,872
21. Linlithgow	80,775	180,323	470,256	168	50,707	73,336	6,502
22. Nairn	51,356	108,703	811,129	1,111	809	42,509	3,573
23. Orkney and Zetland	—	—	—	—	—	—	—
24. Peebles	1,531	76,330	325,448	937	[illegible]8	84,846	3,703
25. Perth	465,218	715,380	2,163,573	15,585	107,065	291,576	62,950
26. Renfrew	127,144	14,436	584,762	1,797	42,795	40,280	23,378
27. Ross and Cromarty	290,179	264,112	620,035	4,004	8,273	160,145	7,281
28. Roxburgh	193,921	509,494	1,121,049	120	33,062	379,046	7,953
29. Selkirk	1,614	84,521	137,385	—	454	46,036	952
30. Stirling	107,655	234,784	736,989	1,590	124,991	73,332	10,215
31. Sutherland	10,183	51,936	93,047	1,968	—	39,052	1,540
32. Wigton	159,173	76,665	1,082,103	6,954	28,693	212,536	12,902
	4,818,499	7,630,601	33,834,319	537,250	1,080,921	6,372,189	523,353

COMPARATIVE STATEMENT SHOWING HOW FAR CROP 1854 HAS BEEN ESTIMATED AS IN EXCESS OR DEFICIENCY OF THE AVERAGE OF THE FIVE PRECEDING YEARS.

1.—COUNTY OF ABERDEEN.

District No. 1.—In twenty parishes the cereals are from two to twelve bushels in excess. The excess is greatest in oats, which in some instances are twelve, fourteen, and even seventeen bushels above the average of the last five years. The root crop is in some cases rather deficient. No report from Kinnellor, Dyce, Newhills, Midmar, or Skene.

2.—Cereals six bushels in excess. Turnips a third deficient; and potatoes scarcely half a crop.

3.—Cereals from one-twelfth to one-fifth in excess, except in Aberdour, Pitsligo, and Tyrie, where an average. Turnips generally an average.

4.—No report.

5.—Wheat rather in excess. Barley five, oats and bere about eight bushels in excess, and turnips an average. Potatoes deficient.

2.—COUNTY OF ARGYLL.

District No. 1.—Cereals rather in excess. Root crops about an average.

2.—Barley three, oats four, and beans six bushels in excess. Turnips an average, and potatoes fully one ton deficient.

3.—Oats in excess in all the parishes, and in some to the extent of upwards of ten bushels. Barley and bere slightly in excess, except in Lismore, Ardchattan, and Muchairn, where deficient. Beans about an average. Turnips from three to six tons in excess, except in Appin, Kilchrennan, and Ardchattan, where deficient. Potatoes generally deficient.

4, 5, 6, and 7.—No report.

8.—Oats an average, bere nearly one and three-fourths bushels, and turnips and potatoes one and a-half tons deficient.

3.—COUNTY OF AYR.

District No. 1.—On a comparison with crops 1852 and 1853, wheat an average; barley seven and bere four bushels deficient; oats about five and beans two bushels in excess; turnips rather deficient, and potatoes somewhat in excess.

2.—Wheat from three to eight bushels in excess. Oats an average in Auchinleck, and in the other parishes from three to fourteen bushels in excess. Turnips an average in five parishes, in excess in three, and slightly deficient in two. Potatoes rather deficient.

3 and 4.—No report.

5.—The cereals rather in excess. The root crops somewhat deficient; and potatoes very much diseased.

4.—COUNTY OF BANFF.

District No. 1.—Wheat generally an average, and in four parishes from two to eight bushels in excess. Barley an average in Rathven, Bellie, Boyndie; elsewhere from three to eight bushels in excess. Bere a full average. Oats from one to nine bushels in excess, except in Bellie, where two bushels deficient. Beans considerably in excess, except in Cullen, where deficient nearly ten bushels. Turnips an average in three parishes; from three to five tons in excess in Ordiquhill and Fordyce; and in the other parishes from one to four tons deficient. Potatoes an average in two parishes, but throughout the rest of the district from one to two tons deficient.

2.—Wheat about four bushels in excess. Barley in four parishes an average; in six from one to eight bushels in excess; in Inveravon deficient upwards of four bushels. Oats from about three to eleven bushels in excess. Turnips rather in excess. Potatoes an average in Rothiemay, but deficient in the other parishes.

5.—COUNTY OF BERWICK.

District No. 1.—Wheat and barley about two bushels and potatoes one ton in excess. Other crops an average.

2.—Cereals rather in excess; beans slightly deficient.

6.—COUNTY OF BUTE.

District No. 1.—Wheat and oats about five, and barley one, bushels in excess. Turnips somewhat in excess, and potatoes rather deficient.

2.—Wheat, barley, oats, bere, and beans from five to six bushels, and turnips three tons in excess. Potatoes one and a half tons deficient.

7.—COUNTY OF CAITHNESS.

District No. 1.—Cereals from three to four bushels and turnips about two tons in excess. Potatoes one ton deficient.

2.—Cereals from five to six bushels and turnips two tons in excess. Potatoes one ton deficient.

8.—COUNTY OF CLACKMANNAN.

Wheat about five, barley one, oats four, beans fully three bushels, and turnips slightly in excess. Potatoes one ton deficient.

9.—COUNTY OF DUMBARTON.

Cereals one-sixth in excess. Turnips a full average. Potatoes generally one-half deficient.

10.—COUNTY OF DUMFRIES.

District No. 1.—Wheat considerably deficient. Oats above and barley about an average. Turnips and potatoes very deficient, the latter scarcely half a crop.

2.—Wheat two and barley one bushel deficient. Oats three bushels in excess. Beans an average. Turnips two and a-half and potatoes half ton deficient.

3.—Wheat four bushels deficient. Barley an average. Oats five bushels in excess.

4.—Wheat and beans five bushels deficient. Oats and barley an average. Turnips five and potatoes two and a-half tons deficient.

5.—Wheat and barley in excess. Oats from three to nine bushels in excess, except in Halfmorton, where two bushels deficient. Turnips two tons in Langholm and five tons in Ewes in excess; elsewhere from one and a-half to three tons deficient. Potatoes an average in Eskdalemuir; elsewhere half ton deficient.

11.—COUNTY OF EDINBURGH.

District No. 1.—Wheat about four, barley above one bushel, and oats slightly in excess. Beans an average. Turnips and potatoes about one ton deficient.

2.—Wheat from one to six bushels in excess, except in Colinton, an average, and in Duddingston two and a-half bushels deficient. Barley five and a-half bushels in Glencorse, three in Newton, and one and a-half in St. Cuthbert's in excess; elsewhere an average. Oats from about two to six bushels in excess except in Collington an average. Beans generally three but in Lasswade six bushels in excess. Turnips in five parishes from one to two and a-half tons in excess, in Duddingston an average. in Colinton one and a-half, and in Newton three tons deficient, Potatoes in six parishes from one to three tons in excess, in two an average, and in one half ton deficient.

3.—In Borthwick, Carrington, Fala, Heriot, Penicuick, and Temple the crops generally in excess. In Crichton, Newbattle, and Stow about an average. In Cockpen and Cranston rather deficient.

12.—COUNTY OF ELGIN.

Wheat from two to four and a-half bushels in excess in eight parishes, an average in seven, slightly deficient in one, and four bushels deficient in another. Barley from two to eight bushels in excess in seventeen parishes, an average in two, and slighly deficient in one. Oats from two to eight bushels in excess in fifteen parishes, and in one to the extent of eighteen bushels; in the other an average. Turnips in five parishes from two to three tons in excess, an average in seven, somewhat deficient in six, five tons deficient in one, and seven tons in another. Potatoes deficient in several to the extent of three or four tons.

13.—COUNTY OF FIFE.

District No. 1.—Wheat and barley ten per cent. in excess. Oats and beans a full average. Turnips and potatoes deficient.

2.—Cereals from three to seven bushels in excess. Beans rather above an average. Turnips an average. Potatoes about one ton in excess.

3.—Wheat nearly two, barley, oats, and beans four bushels in excess. Turnips rather above and potatoes rather below an average.

4.—Wheat and barley four and oats three bushels in excess. Beans, potatoes, and turnips above an average.

14.—COUNTY OF FORFAR.

District No. 1.—No report.

2.—Wheat from two to six and a-half bushels in excess in sixteen parishes, an average in Craig, Logie-Pert, Lunan, Maryton, Montrose, Stracathro, and Tannadice, and two bushels deficient in Edzell. Barley in excess from three to ten bushels in twenty-four parishes, and about two deficient in Edzell, Fearn, and Stracathro. Oats from two to fourteen bushels in excess, except in Stracathro, where two bushels deficient. Beans from two to five bushels in excess in seven parishes, and from two to seven deficient in six. Potatoes rather in excess in Craig and Kirkden, an average in Dun, Brechin, Carmyllie, Dunnichen, Fearn, Guthrie, Montrose, and Rescobie, and somewhat deficient in the other parishes. Turnips one and a-half tons in excess in Oathlaw, an average in Dun, Brechin, Caraldstone, Carmyllie, Dunnichen, Farnell, Guthrie, Lethnot, and Stracathro, and from half a ton to three tons deficient in the remaining parishes.

15.—COUNTY OF HADDINGTON.

District No. 1.—Crops generally about five per cent. in excess.

2.—Crops generally about eight per cent. in excess.

3.—Wheat and bere three, barley four, and oats five bushels in excess. Beans an average. Potatoes rather deficient. Turnips one and a-half tons in excess.

4.—Wheat and oats ten per cent. in excess. Other crops an average.

5.—Crops generally an average.

6.—Crops generally an average.

16.—COUNTY OF INVERNESS.

District No. 1.—Wheat two and oats four bushels in excess. Barley an average.

2.—No report.

3.—Wheat four, barley and bere two, oats six bushels, and turnips two tons in excess, and potatoes two tons deficient.

4.—No report.

5.—No report.

6.—Barley, bere, and oats about one-fifth and turnips one-fourth deficient. Potatoes a failure, upwards of four tons deficient.

17.—COUNTY OF KINCARDINE.

Wheat an average. Barley and oats five bushels in excess. Beans four bushels and turnips four tons deficient. Potatoes an average.

18.—COUNTY OF KINROSS.

Wheat, barley, oats, and beans somewhat in excess. Turnips nearly two tons and potatoes fifteen cwt. in excess.

19.—STEWARTRY OF KIRKCUDBRIGHT.

District No. 1.—No report.

2.—Oats about five bushels in excess. Potatoes nearly two-thirds deficient. All the other crops an average.

3.—Wheat about two bushels deficient. Barley nearly six and oats about four bushels in excess. Beans an average. Turnips nearly two tons in excess, and potatoes about two tons deficient.

4.—Barley seven and oats five bushels in excess. Turnips slightly and potatoes nearly one ton in excess.

20.—COUNTY OF LANARK.

District No 1.—In Barony, Govan, Hamilton, and Old Monkland parishes, wheat from three to six bushels, barley about eight, and oats from six to nine bushels in excess. Beans somewhat above average. Turnips and potatoes rather deficient. In Cambusnethan the crops generally a full average.

2.—Cereals generally four bushels in excess. Turnips rather above an average. Potatoes nearly two tons deficient.

21.—COUNTY OF LINLITHGO.

No report.

22.—COUNTY OF NAIRN.

Wheat an average. Oats and barley rather in excess. No report as to potatoes and turnips.

23.—COUNTY OF ORKNEY AND ZETLAND.

No report.

24.—COUNTY OF PEEBLES.

No report.

25.—COUNTY OF PERTH.

District No. 1.—No report.

2.—Cereals generally from five to ten per cent. in excess. Turnips a fair average. Potatoes considerably deficient.

3.—Wheat from two to four and a-half, barley from three to six, oats from three to eight, and beans from one to three bushels in excess, except in St. Martins, where beans six bushels deficient. Potatoes and turnips considerably above an average.

4.—Barley, oats, and beans considerably in excess. Wheat in excess in the higher parts of the district, but deficient in the lower. Potatoes an average. Turnips superior where not too early sown.

5.—No report.

6.—Wheat in excess. Barley an average, except in Aberfoyle, where five bushels deficient. Oats from three to five bushels in excess. Beans rather above an average. Turnips about an average. Potatoes an average, except in Balquhidder, where fully two tons deficient.

7.—No report.

8.—Wheat, barley, and oats about seven, beans about four bushels, and turnips and potatoes about two tons in excess.

9.—Cereals an average, except autumn wheat, which is deficient.

26.—COUNTY OF RENFREW.

District No. 1.—Crops generally a full average.

2.—Wheat from three to six bushels in excess. Barley, oats, beans, and turnips an average. Potatoes about one ton deficient, and from twenty to forty per cent. diseased.

3.—No report.

4.—The cereals generally ten per cent. in excess. Turnips an average, and potatoes two-thirds deficient.

27.—COUNTY OF ROSS AND CROMARTY.

District No. 1.—Wheat, bere, and turnips an average. Barley and beans four bushels in excess. Oats two bushels and potatoes at least five tons deficient.

2.—Crops generally above an average.

3 and 4.—No report.

5.—The potato crop was a failure.

6.—Barley and oats nearly four bushels, potatoes six, and turnips about eight tons deficient; the worst crop of turnips ever known in the island (Lewis).

28.—COUNTY OF ROXBURGH.

District No. 1.—Wheat three and a half, barley seven, oats four, beans five bushels in excess. Potatoes and turnips two tons deficient.

2.—Wheat and oats two and a half, barley five, peas and beans about four bushels in excess. Potatoes an average. Turnips three tons deficient.

3.—No report.

4.—In the parish of Hobkirk cereals from nine to twelve bushels in excess. Potatoes an average; and turnips four tons deficient. No report from the other parishes of the district.

5.—Cereals generally in excess.

6.—Cereals generally six bushels in excess; the root crops about an average.

7.—Cereals generally four bushels in excess.

29.—COUNTY OF SELKIRK.

Oats six and barley four bushels in excess.

30.—COUNTY OF STIRLING.

No report.

31.—COUNTY OF SUTHERLAND.

District No. 1.—Bere and oats from two to eight bushels in excess. Turnips an average in Durness, one ton in Farr, and three in Reay in excess, and four tons deficient in Tongue. Potatoes twenty per cent. in excess in Farr, an average in Reay, and twenty per cent. deficient in Durness and Tongue.

2.—The crops from the continued wet weather in early harvest were seriously injured.

32.—COUNTY OF WIGTOWN.

District No. 1.—Wheat in excess, one-third in Kirkcowan, and one-seventh in Penninghame; elsewhere about one-sixth deficient. Barley in Kirkcowan one-third, and in Penninghame, Glasserton, and Whithorn about one-sixth in excess; elsewhere an average. Oats generally about one-eighth in excess, and about one-third in Kirkcowan. Beans rather above an average in Kirkcowan and Penninghame, and deficient throughout the rest of the district. Turnips rather below an average, except in Penninghame and Wigtown, where one-eighth in excess.

SCOTTISH AGRICULTURAL STATISTICS.

The agricultural statistics of Scotland for 1854 are now published. Despite their somewhat dry exterior, they will yield to the farmer, to the statist, and to the political economist much valuable information. In our brief notice, we can only advert to a few of the more prominent and striking facts with which they are replete, leaving to local authorities the duty of expatiating upon the capabilities of particular counties, and to magazines the serious examination of the subject in its social and economical bearings.

From the report and tables before us, we learn that there are about 50,000 farmers in Scotland, and 11,369,224 acres occupied agriculturally. Tenants paying less than £10 in Lowland and £20 in Highland counties are not included in this calculation; but the particulars of their holdings will be embodied in a supplementary report now in preparation. The total area of Scotland, including islands, lakes, and rivers, is 30,238 square miles, or 19,352,320 acres. Mr. M'Culloch says that only one-third of this is cultivable; but this is a very low estimate, for estimating the small holders as occupying about one-hundredth of the area of the others, it appears that about two-thirds of our country has been brought under the domain of agriculture. Of the rest, 413,391 acres are returned as woods; but this does not include many of our largest forests. Many thousand acres, rough and bare, lie along our mountain slopes, dip into our romantic glens, or are buried beneath our many lakes and streams. Houses and roads include much ground, 830,730 are returned as "waste." No statement is given of improveable land; but there cannot be a doubt that thousands of acres now covered by heather and morass, and barely stocked with game, will yet wave with golden grain, or afford profitable food for cattle and sheep.

We throw into a tabular form the proportion of the different kinds of crops in Scotland, England, and Ireland. In all the three countries the grain crops occupy about twice the extent of green crops and fallow. The grass crops do not, however, afford subject for comparison, as the English and Irish statements include only "meadows," while the Scotch figures comprise between seven and eight million acres of permanent pasture and sheep ranges. In Scotland the meadows and grass under rotation amount to one million and a half acres, and are therefore more extensive than in England and Ireland.

	SCOTLAND. Acres.	ENGLAND. Acres.	IRELAND. Acres.
Grain crops	1,374,515	6,500,000	2,742,154
Wheat	168,216	3,000,000	411,423
Green crops	581,507	2,500,000	1,417,533
Bare fallow	26,128	800,000	—
Grass crops	9,248,433	1,300,000	1,257,717

A most striking difference is exhibited between the actual produce of the grain crops in Scotland, as compared with the most accredited estimates. Mr. M'Culloch's calculation, approved of by many practical authorities, overstates the produce of wheat and barley by one-half, and that of oats by one-third. This surely shows most unequivocally the clamant necessity for a regular system of agricultural statistics.

From her colder and later climate, Scotland is less adapted for the growth of wheat than the southern parts of the island. England is estimated to grow thirteen million quarters, while Scotland has little more than one-twentieth of that quantity. The yield per acre—28¾ bushels—is, however, rather above that of England, as estimated by Lavergne. The two northern counties, Caithness and Sutherland, stand highest in average produce per acre, being 36 and 34 bushels respectively; but the acreage of wheat in these counties is small, that crop being grown there only on wet lands coaxed with a liberal supply of manure. Edinburgh, Haddington, Lanark, and Renfrew, yield about 32 bushels per acre; Berwick, Dumbarton, Fife, Forfar, and Ross, about 29; Aberdeen, Ayr, Inverness, Roxburgh, about 28 bushels; Perth and Kirkcudbright, 26 bushels—the lowest average of all. This year's crop, although not turning out so well as was at one time anticipated, is generally considered a full average. Fife, as will be observed, grows the most wheat of any county in Scotland, Peebles the least. As agricultural improvements advance, this crop will be more largely grown. A century ago the sowing of wheat was considered rather a hazardous operation in Scotland; and in 1727 a small field of eight acres, within a mile of Edinburgh, was such an "extraordinary phenomenon;" as to attract general attention. Upwards of seven thousand bushels of wheat are annually grown in Morayshire, and some of the best samples in the London markets come from that county. Yet 50 years ago "the farm produce consisted of bere or bigg on dunged land, rye, black oats, brocked oats, and a few patches of white oats. The quantity raised was but seldom equal to the consumption." Facts like these afford ample evidence of the industry and energy of Scottish farmers. They demonstrate that the art which they practise is vigorous and flourishing, and perfectly free from that "degeneracy" with which it has been recently so unjustly charged. Including the progressive increase since the date of the last census, the population of Scotland is now rather above three millions; and distributing our total produce of wheat equally amongst this number, affords to each an annual allowance of 96 lbs. To this must be added the wheat grown by small holders, which, however, would not amount to much, and from it must be deducted about one-seventh returned to the soil as seed. We believe that, as regards Scotland, the export and import of wheat, as well as of other grains, pretty nearly balance each other.

Barley is most productive in Haddington, affording to the active and enterprising farmer of that rich county 46¾ bushels per acre. In Mid-Lothian the average is 40½, diminishing throughout the other counties until it falls to 31¼ in Perthshire, and 30¼ in Kinross. The smaller returns result from the great preponderance in these two counties of poor and high-lying land, which here, as elsewhere, reduces the county average of every crop. In the total produce of barley, Fife contributes nearly one-seventh of the whole, or twice as much as Edinburgh, Roxburgh, or Haddington, one-tenth more than Forfar, and three-tenths more than Perth. A considerable portion of this grain is used as human food, some goes to feed the lower animals; but, in spite of teetotalers and police regulations, most passes into the hands of the brewer and distiller. About five million quarters of barley are made into malt every year in Great Britain, and upwards of one million quarters are distilled in raw state.

Aberdeen is the largest producer of oats, growing upwards of six million bushels. Ayr grows two and a half million bushels. Perth, Forfar, and Lanark, about two million each, and Dumfries, Fife, and Banff about one-fifth less. Sutherland stands lowest. The yield per acre varies from about 32 bushels in Inverness and Nairn, 48¼ in Haddington. In Berwick it is 41¼, and in Ayrshire, where wheat and barley—denizens of a drier climate—are below average, oats yield 40¼ bushels per acre. The oat crop this year is probably the best the country has ever seen, and reference to appendix No. 1 shows in many districts an excess of eight and ten, and in a few cases of nearly twenty bushels. The greater proportion of the oat crop, even in Scotland, is consumed by the lower animals. The title of "Land of Cakes" is scarcely so appropriate as it once was; for wheaten bread is now largely consumed by all classes, particularly in the towns.

Scotland raises rather more beans than Ireland, but only about one-seventh as much as England. Between four and five thousand acres of the carse lands of Stirling are under this crop. The clay lands of Edinburgh, Fife, Lanark, and Perth contribute about 15,000 acres in nearly equal proportions. Excluding Peebles, where the yield sinks to the minimum of 17 bushels per acre, the average produce in the other counties oscillates between 26 and 34¾ bushels, the latter figure being reached in Banff and Kincardine. The average for all Scotland is 28¼ bushels per acre.

Six and a half million tons of turnips, including the probable quantity grown by cottars and small tenants, are annually raised in Scotland, and yet only one hundred years have elapsed since this bulb, which has revolutionised the whole system of agriculture, was introduced into Scotland. In 1747 Dr. John Rutherford first sowed turnips in Roxburghshire, and six years later Mr. Dawson set the example on a larger scale. Lord Kames brought turnips to Berwickshire about the middle of the century. John Lee first drilled turnips near Dunbar in 1784, and four years later first folded sheep upon the crop. Those sheep had been previously grazed upon Arthur Seat. Swedes only came into use in Haddington about fifty years ago. John Macdougal, a small farmer at Linton, first raised turnips in Peeblesshire, in 1786, and was likewise the first in that county who grew potatoes in the open fields. In 1811 there were 20,000 acres of turnips in Aberdeenshire. Now the breadth is nearly quadrupled. Many farmers will be struck with the smallness of the averages for turnips:— Berwick only 15 tons 7 cwts.; Fife, 14.10; Haddington, 14.8; Dumfries, 12.12. But it must be recollected that these estimates were, in many instances, sent in shortly after harvest, and before the crop had reached its full bulk. Had the earlier returns been made five or six weeks later, they would, we doubt not, in most instances, have exhibited an increase of several tons per acre.

Potatoes occupy about one-third of the area of turnips. In many parts of the country they are seriously deficient, often much diseased, and some parts of Aberdeen and Renfrew, as well as in Ross and Cromarty, scarcely half a crop. Fife, Perth, and Forfar, are the largest growers of this root. In spite of the disease, it is regarded a profitable crop, and in most counties the breadth exceeds that planted prior to the failure of 1846. In Selkirk the yield per acre is 5 tons 10 cwts.; in Berwick and Haddington, 5, 5; in Edinburgh, 4, 15; and Fife, 4, 14.

Mangold is only of very recent introduction, but from its high nutritive value it promises to extend itself wherever the climate is sufficiently genial. It is especially grown in the dairy counties, and in the neighbourhood of large towns. It is a valuable substitute for turnips; and as it does not, even when used raw, communicate any disagreeable flavour to the milk; it is much prized for the feeding of cows. Fully one-third of that grown in Scotland is raised in Ayrshire, where upwards of 700 acres are devoted to this root. The produce varies from 12 to 16 tons per acre. Seventy-seven acres are grown in Mid-Lothian. The return in one district is 20 tons; but in another scarcely half of that.

Ayrshire contributes 322 acres of carrots, full one-fourth of the produce of all Scotland, and Haddington 103 acres. The produce varies from 7 to 14 tons; but in some districts of other counties, where the climate is less favourable, or the cultivation less understood, the yield does not reach 4 tons per acre.

Cabbage, like mangold and carrots, is now becoming fully recognised as an article of farm produce. It occupies about the same extent as carrots. About one-third of the whole is grown in Ayrshire, and one-fourth in Lanarkshire. The produce is estimated at from 13 to 17 tons per acre. In some counties it is higher, as in Berwick 32 tons; in others lower, as in Ross 4 tons.

Turnip seed is returned as occupying 1,429 acres; is chiefly cultivated in Aberdeen, Edinburgh, Haddington, and Perth; and yields from 5 to 26 bushels per acre.

The published tables do not set forth the average produce per acre for the *whole of Scotland*; but as that is a point of considerable interest, especially as regards the following more important crops, we make the necessary calculations, and subjoin the result:—

	Bushels.	Pecks.
Wheat, ...	28	3
Barley, ...	36	3
Oats, ...	36	1
Bere or Bigg, ...	29	2
Beans, ...	28	2
	Tons.	Cwts.
Turnips, ...	14	13
Potatoes, ...	3	13

We believe that the Scottish system of collecting the statistics is preferable to that followed either in England or Ireland. It is entirely voluntary and worked by the farmers themselves. It is not as in England the invidious task of the poor-law guardians, or as in Ireland the imposed duty of policemen or constabularly. Under our system, the farmer himself makes his own return of acreage and stock, and sends it directly to Mr. Maxwell. The information thus given in confidence cannot possibly be discovered by landlord, by poor-law officer, or by government official; and the published statements cannot possibly afford the slightest clue to individual returns. In proof of the confidence with which the farmers regard the measure, we require only to mention the gratifying fact that of the 50,000 schedules issued all have been returned, with the exception of one-eighth per cent. In their ready support of the undertaking, the farmers of Scotland have exhibited a favourable contrast to their English brethren, who, in considerable numbers, resisted the inquiry of last season. Well have they merited the high testimony borne to their "intelligence and public spirit" by the Secretary for the Board of Trade.

We are sure that Mr. Maxwell's hopes of the success of the inquiry expressed in the concluding sentence of his report cannot fail to be fully realised. Beginning with the preliminary inquiry of last year, the history of the measure points unequivocally to its future success and utility. The Highland and Agricultural Society, ever foremost in the prosecution of any scheme which promises to benefit the "first of the arts," gave it the full weight of its powerful influence; while Mr. Hall Maxwell, the secretary of the society, has applied himself with the utmost ability, zeal, and perseverance to the efficient working out of the scheme. He held meetings in most of the county towns of Scotland, explained to the farmers the machinery and advantages of the measure, secured the active co-operation of upwards of 1,100 agriculturists as enumerators of districts and members of committees, procured lists of all the tenant farmers of Scotland, and despatched to them upwards of 50,000 schedules. The postage paid for these, and for the correspondence incident to the inquiry, have cost £525. The schedules were returned directly to Mr. Maxwell, their contents transferred to the books, and duly arranged and tabulated. After harvest, the enumerators and their committee-men met, and drew up reports of the average produce per acre of the several crops. These were forwarded to Mr. Maxwell, and afforded the means of discovering the produce. In the working of the inquiry Mr. Maxwell has been ably assisted by Mr. Duncan and Mr. Finlay Dun.

Now that an effective machinery is duly organised, the conduct of the inquiry will in time coming be simplified and facilitated. The schedules will be issued earlier in the season, and the results published in October or November. Many useful observations, besides those at present included, will doubtless be embodied in future inquiries. The different kinds and quantities of manure applied, with the results obtained; the varieties of each crop adapted to particular localities; the influence of exposure, climate, drainage, &c., on the quantity and quality of our crops; the prevalence of diseases affecting crops and animals; the different breeds of sheep and cattle in different situations; the relative value of feeding stuffs—these, and countless other important practical investigations, might thus be taken up *seriatim*, and conducted in connection with the inquiry. We should thus materially enhance the utility of our statistics, and gradually collect a mass of facts of inestimable value for indicating our agricultural capabilities, for comparing our produce from year to year, for noting our shortcomings, and marking our progress.—*Caledonian Mercury.*

NATURE'S LAW OF MANURING.

SIR,—In Mr. Mechi's balance-sheet, he says (as published in the *Mark Lane Express* of Dec. 25th) that he has made his land of the value of 36s. per acre to let, a very small sum considering the outlay upon Tiptree Hall. In his series of letters on agricultural improvement, as published by Messrs. Longmans, the farm, he says,

Cost	£3,250 0 0
Expenditure on the farm............	6,200 0 0
Since, laying down the liquid manure tubes at £6 per acre, 130 acres	780 0 0
	£10,230 0 0

The rental produced at 36s. per acre would be £234, a trifle over 2¼ per cent. for his outlay—not a very great inducement for landlords to tread in his footsteps as he advises. I very much question if this would cover the outlay of capital, as his work was published in 1845, and I make no doubt that he has in buildings and many other things far exceeded the outlay of £10,230 upon 130 acres of land, and if all the capital expended on Tiptree Hall could be got at, I very much doubt if he gets 2 per cent. for his outlay; yet he holds out this as an example for the owners of land to follow! If landlords cannot make more than 2¼ per cent. for their outlay of capital, I think they would be mad to follow such an example.

With regard to converting all the manure of the farm into liquid, I very much doubt but that it would produce disease in the plants. It is not Nature's manner of manuring: Nature always manures in a solid manner. Woods and prairies in a state of nature, which are and continue to grow richer, are manured by the decay of the fallen leaves and dead herbage; that process continues for generations, producing the most luxuriant growth year after year without deterioration of the soil, and when brought under the plough it is found the most productive land. If you depart from Nature's laws, the punishment of such infraction is sure to follow; and, as regards the manuring of the soil, if all is applied in the liquid form, the consequence would be disease; such liquid manure being applicable only to grass, &c., and for any length of time would not suit the cereals. Where Nature manures at all in the liquid form is in deltas of large rivers, the growth being rank grass or jungle. In the overflowings of the Nile, the manure brought down, or rather new earth matter, is not applied after the corn is planted. That Nature's method is the slow and constant decay of vegetable and animal matter may be seen from the enormous crops of wheat and other corn that is produced upon poor clay land when first broken up for pasture. I have grown 7 and 8 quarters of wheat for several years after such breaking up, with no other manure than that of the rotting sward, the true food of plants. Look at the system followed of growing flowers and vegetables to the greatest perfection at the present time. It is not by liquid manure, but by planting them in mould formed from decayed vegetables, and which is Nature's method, whom we must follow for certain results, as well in the growth of plants as in mechanics. I have, as an experiment, grown wheat for a succession of years on the same land, the manure being its own chopped straw returned to the land as it was taken off, with a very slight addition of guano and lime to make up for the removal of the corn. The result has been good, and proves that wheat or any other crop may be grown for ever on the same land, provided you return to the soil the straw that comes off it. It is Nature's law of manuring and whoever heard of the forests of America or her prairies becoming exhausted? She annually manures the land by the decay of a part of its own plants, as the leaves, &c. The use of liquid manure for grass land has been known for generations, and I know of meadows that have had all the waste liquid manure of the farm properly conveyed over them, besides the use of the juice cart, which was constantly in use on the said farm 70 or 80 years ago. That Mr. Mechi has done some good, all must admit, by bringing such things again before the public; but blindly following out his practice under all circumstances would lead to the most disastrous results. Mr. Mechi seems to forget that a few degrees of more or less heat, or a few more inches of rain, or more or less sun, affect the crops more than all of man's operation. For proof of this, witness the season of last year, the propitious weather producing the most abundant crops on all kinds of land. Farmers are perfectly agreed upon the use of drainage and economic use of their manure, and I am glad to find they are not willing to be led away by every whimsicality carried to extremes by visionaries. You can only assist Nature in the growth of vegetables; there is the life of the plant, that does the greatest part in its growth, which people are apt to overlook. Chemistry can aid and assist, but it can only be by watching Nature's laws and assisting them. The analysis of vegetable products reduces them to a very few elements, as oxygen, hydrogen, carbon, &c.; but no person has been able to form the vegetable or grain by combining the resolved elements, plainly showing the *vis vitæ* of plants, which man is apt to forget. In my experience of farming, which has not been little, the grand aim is to follow Nature's method; and one of them is to fill the earth as much as possible with vegetable fibre, such as roots of clover, chopped straw, animal remains, and all things affording a constant decay of vegetable or animal matter to afford food for plants, and there is no fear of abundant crops. Nature only supplies vegetable manure, but we can add of course animal manure with effect to it; nevertheless, the principal food for plants must be supplied by their own decay.

These few observations, if worthy of a place in your paper, and if any benefit by directing the mind of farmers to the proper growth of plants, would oblige an old subscriber and retired farmer. I am, Mr. Editor,

Yours, obediently, J. SWAN.

Acton, Feb. 12.

THE TENURE OF LAND—BY LEASE OR AGREEMENT.

Nearly every one amongst us will be found ready armed with his own pet panacea, upon the observance of which our safety and success must be sure to depend. It has indeed always been so. From the Puritan who enjoined his men to put their trust in Providence, but to keep their powder dry, down to the honest cobbler who ingenuously confessed there was nothing like leather, every adviser orders something more or less identified with his own bias or experience. The orator of old traced all the strength of his art to the graces of action; the Irish gentleman found the great secret of earthly happiness in never mixing his liquors nor sitting with his back to the fire. According to Mr. Barnum, all prosperity depends upon advertising yourself or your wares; or, by Mr. Brotherton, on being in bed by twelve o'clock. Mr. Hume's recipe is to take care of the pence; and Mr. Cobden's, to take care of yourself. Everybody, we see, will be rich, happy, and honoured after his own especial fashion.

There is no man more blessed in such a multitude of counsellors than the agriculturist. Upon what may *his* safety and success chiefly depend? Could we suggest a more open question, or one so susceptible of such an infinite variety of answer? The farmer's success, then, says one gentleman, consists in a word—progression. Another, in his response, explains this progress to be, believing everything he hears, and at once acting on it. Capital is the grand point of all farming, says a third: with security of capital, you would add, joins in a fourth. There is no farming without a lease, decides a friend from the north; or without liquid manure, chimes in another from the city. Or without drainage—or without artificial manures—or without shorthorns—or without educating the labourer—and so on. The very foundation of improved agriculture is centred more particularly in some one of these, according to the reasoning of the counsel we are consulting. Now it is capital; then progression, tenant-right, leases, drainage, education—every one ready provided with "a special retainer."

Of all these important items none occupies a more anomalous position than one which many good men have been taught to consider amongst the most important and indispensable. Still at the same time it is one upon which there is unquestionably the greatest difference of opinion. It is a point, too, that has just now come in for some further discussion, his Grace the Duke of Richmond having re-opened the subject at the late Smithfield Club dinner. The case may be put in a very few words. Speaking as he generally does directly as a practical man, his Grace says, "I have some very good tenants, and I want them to have leases." To which the tenants straightway reply, "we have a very good landlord, and we don't want to have leases." And then we have a cheer for the Duke, and a look of astonishment for the tenantry. Why don't they take leases? why does not every farmer insist upon a lease? and so forth.

If you question a Scotchman on this matter, he will tell you deliberately, and, we believe, conscientiously, there can be no good farming without a lease. No man can be justified in attempting it; and he will often go beyond this, and assure you there is no good farming to be found without a lease being associated with the system. In his own country we will reverse the saw, and admit he is a true prophet; while out of it, so far as this question be concerned, he is none at all. The great part of England is farmed without leases; the best farming in England is achieved without leases. The most improving estates at this day are conducted without any particular regard for such a tenure on either side. When, then, the Duke of Richmond, who as a landed proprietor in Scotland is no doubt inclined to many of its customs, offers leases here, and finds his offer neglected, he may perhaps be surprised: but it is the surprise rather of the Laird than of the Duke. The conduct of the Goodwood tenantry is by no means an exception in England. There are many large estates where owners have repeatedly proposed the same thing, and have been met with the like refusal.

There are those, we are aware, who cannot profess to understand this; and yet, after all, the fact may not be a matter of so much surprise. We have certain eras when a man's binding himself down to a long lease would be impolitic, and, as a business arrangement, most probably impracticable. Take, for example, either what are called very good or very bad times, when agricultural produce is very high or very low. In the former case a prudent man argues with himself that these prices may not continue, while the temporary effect of them is pretty certain to be observable in the terms he would have to sign and seal for. A long lease, then, commencing at "war prices," may not read as the best of speculations for him who takes it. In bad times it is simply a greater speculation still. Human nature, however, rarely prompts any of us to identify ourselves more closely than is necessary with "a bad business," and landlord and tenant so often enough agree to wait and wear on till things improve.

"But how are you to get on without a lease?" ask those who have nailed their colours to it. "How can you expect to have employment of capital without security of tenure?" The answer is a very simple one—each of us has his own favourite recipe. The Duke of Richmond, at the Smithfield Club, pointing to Scotland, says, "take a lease." Mr. Pusey, at the Royal Agricultural Society, looking to Lincolnshire, says, "take a tenant-right." Security of capital, and security of tenure, as we have often had occasion to impress, come to much the same thing. With a custom or agreement allowing a man to claim his own at the end of a term, tenants farm as well, and, what is more, continue as long or longer in their occupancy, than those who have all the holdfast of a lease.

The agriculturists, in simple truth, should have their choice. We are no great advocates for forcing any system upon them. Let the landowner, who really wishes to see them doing their best, allow them this opportunity. Let him say, "However well you and I individually may understand each other, this should be a matter of business. I wish it to be so in justice to yourself. Will you have a lease, or a shorter agreement, with compensation clauses?" A practical farmer, and a Sussex man, who can scarcely speak too highly of the Duke's address at the Smithfield Club, still comes very much to this same conclusion. Mr. Cousens, at a meeting of the West Sussex Farmers' Club, in proposing his Grace's health, thus refers to it:—"It was a good trait in his character to come forward and offer to shield them from coercion, and protect them from any influence which might be brought to bear on them by his successor. He (Mr. Cousens) was sure that what his Grace said on the occasion to which he had alluded was sincere and intended; there was no mistake about it; and he (Mr. Cousens) was only surprised that his Grace should have such an improvident set of tenantry about him, who would not say 'We will farm our land to the advantage of our families.' He was surprised that such a state of things should exist in West Sussex; he was surprised that, without any agreement whatever, tenants should subject themselves to a change in the dukedom, or a change of temper, or anything else."

So far so good. If they have nothing to show for what they are expending, we are afraid, with Mr. Cousens, that his Grace's are but "an improvident set of tenantry." Mark, however, the manner in which the West Sussex farmer proceeds:—"If a law were passed that would give the tenant compensation for improvements it would be a very different thing; but the tenant-farmer was a serf—the pill was not easily swallowed, but it was the real truth; and therefore he thought it noble of the Duke of Richmond to come forward and offer to emancipate men who did not care to do it for themselves. He (Mr. Cousens) wished to see them in the position of free and independent agriculturists of Great Britain, and he wished to see them in such a position as would enable them to obtain compensation for any expenses they may be put to."

We say "ditto" to Mr. Cousens. This is the independent position we have always contended for. But if the law in its delay will not give it, why should not the landlord? More than this, he *is giving* it. Call it what you will, and after all there is no term so expressive as that which declares the tenant's right to his own, the principle is day by day developing itself. Private agreement is everywhere bearing testimony to the soundness of that the Legislature so strangely quibbled with. Go into any district where great improvement is discernible—ask any agent who is doing his duty by his employer—take one example from a hundred, and the wilds of Exmoor like the fens of Lincolnshire are giving ample evidence to the action of tenant-right upon the cultivation of the soil. If custom or law will not sanction it, agreement, we repeat, will. It is this we counsel the tenant to ask for. Without this, or the lease, he comes too clearly within the circle of Mr. Cousens' "improvident set." At present we might hesitate ere we advised him to venture on the latter alternative. With the former, however, he can never be wrong; he can never, in fact, be in a proper position without its influence to direct him. As far as the permanent improvement of the land is concerned, even a lease is a nullity without a tenant-right clause to see it out with. If a landlord really means well, he will be as ready to give a tenant-right agreement as a lease: while he will find few of his tenantry but who will avail themselves of either the one or the other.

A MAGNIFICENT FARM AND FARMER.—A Vermont paper says:—"Among the conspicuous men in the Vermont Legislature is Mr. B. G. Brigham, of Fairfield. He owns and cultivates 1,300 acres of land. Among his barnyard items are two hundred and twenty cows, twenty horses, and five yoke of oxen. In his dairy he makes butter only. The average yield of butter from the milk of each cow is one hundred and fifty pounds. Two huge 'dasher' churns are set in motion by two 'horse powers,' and the butter is 'worked' by the old-fashioned 'paddle.' His stock of cattle consumes about five hundred tons of hay annually. 20,000 lbs. of pork, 500 bush. of wheat, from 400 to 500 bush. of corn, 1,000 bush. of oats, and from 1,000 to 2,000 bush. of potatoes, are among his yearly products. 'The Man of Uz,' in his best estate, could not do better than this. Mr. Brigham himself is got up with a breadth of beam, and in a style of magnificence proportionate to the extent of his possessions and agricultural products—he standing 6 feet 4 in his boots, and weighing by one of Fairbank's patent balances, 300 lbs. precisely."

CUMBERED GROUND AND THE FORCE OF EXAMPLE.

A young man lately took a farm near the town of ——, in the county of ——. Upon associating with the neighbouring farmers, he was repeatedly hearing very loud complaints about the labourers. "They are a worthless set of rogues," said one; "pilfering villains," said another;" "lazy rascals," cried a third; "the worst set of fellows in existence," exclaimed a fourth. The vice of drunkenness was not particularized against any few, because, from general report, it seemed common to all. So sure as a man possessed a swallow, he possessed it, as it appeared, for beastial purposes; and to say that he had a throat seemed tantamount to saying he was a sot.

My friend found, indeed, that there was much truth in the assertions made to him with respect to the vicious and disorderly habits of the men. The people he employed during his first year's residence in the locality fully bore out the character that had been given them. He could repose no manner of confidence in them—they showed daily, by word and deed, that each man looked keenly after his own interest, and cared not one jot for his master's. As sure as Monday morning came, some three or four of the hands were off, "randying," "pleasuring," "spreeing," and would return with a sheepish or hang-dog look, only when the week's wages had gone to give a little extra comfort to the *publican's* family arrangements. The business of the harvest might stop for them; the over-ripe wheat might shell on the ground, or lie exposed in stacks to the incidents of the weather—what mattered it, if the hands were "dry?" The poor horses, too, had to suffer the consequences of this constitutional *weakness for taps*. Never, scarcely, did a waggon go out with corn but they had to wait hours, pulled up beside first one, and then another, of those innumerable "houses of call" that always mark a road upon which there is much of such traffic. No matter what the weather might be, there they stood. Impatient from long abstinence, they would sometimes start home by themselves, frequently occasioning or sustaining injury by the way; or, if by chance their driver returned with them, he was generally found at the bottom of the waggon, just so conscious of time, place, and circumstance as to be able to assure all beholders in the gravest manner, with a cordial "Give us your hand, my hearty," that "he was all right, and the horses all right, and every body all wrong, saving himself."

It must have been, as my friend said, infinitely trying to the patience. The irregularity, the loss of time, the constant recurrence of broken bones, and the damage that resulted to property in many ways, were provoking. Having a humane heart, he seemed to feel more for the poor men, and the misery their evil, improvident habits brought upon themselves and families, than for the way in which they proved prejudicial to himself. The clothing in which they appeared, sufficiently indicated the low degree of their domestic comfort. Decency was scarcely preserved. It seemed as though a common custom amongst the Irish prevailed here; for the trousers were cut apparently to mend the coat, and the coat to repair the trousers!

Accustomed to reflection, my friend cogitated upon this state of things. Every effect has its cause, thought he; so he looked around him. He knew well the nature of *influence*, the higher upon the lower, in all grades of life. He remembered that common-sense proverb, "As are the masters, so are the men," and with this moral direction he commenced his scrutiny. Nor was he long in elucidating the proverb.

Chatting with a neighbour one day, he learned that Mr. ——, a considerable farmer, having become impressed with the danger that attended his nocturnal and early morning excursion from the "Wanderer's Retreat" to his own home, in a muddled state, had devised a means of shortening the distance, and lessening the hazard. He had actually procured a licence to sell beer upon his own premises. The worldly-wisdom of this scheme was apparent in a short time. Instead of being occasionally drunk, he was now never sober. He paid the men their wages in beer, and they did no work. Many sat and got fuddled with him, ran up a long score, and finally moved off. His hay and harvest fields were scenes to behold! Thus he, too, adopted the sage custom of cutting the coat to patch the trousers!

Some characteristics of the individual who related these facts—a man occupying some hundreds of acres, and an extensive employer of labour—my friend learned subsequently. Fierce and extortionate, intemperately rash and unjust to his people, he sometimes provoked them so that passions were roused, coats thrown off, and battles fought—battles not always to the strong. He attended no place of Worship, and cared not for the observance of the Sabbath. Another case came before him. One Sunday, on passing a low beer shop, he observed a neighbour of his, playing skittles with a group of wild intoxicated men. This man employed many hands, and, as my friend heard, made common cause with them in desecrating the Sabbath. Out of *fifteen* of his immediate neighbours, there were not *five* decent, respectable characters. The question received its solution at once.

The bulk of these men had no moral perception. They hated and punished severely, when they could, the vices they cherished in themselves. They regarded them, too, merely as they proved injurious to themselves. The consequence of a man's depravation to the man himself, to his offspring, to the neighbourhood, they seem never to have thought of. The very spirit in which they complained of the intemperate habits of the labourers reminds one of the indignant exclamation of a publican's wife, who, on relating the fact of one of her husband's excesses to a friend, virtuously cried, "The tarnation old fool, for to go and get drunk on rum punch!" His crime in her eyes was his extravagance—*rum punch!* The fault of intoxication was venial!

I don't quote these cases as a specimen of the wretchedly low moral tone of British farmers. God forbid! I only wish to show the *power of influence*—a power that exists and is felt in the cities as well as in the villages. But village influence is greater than that exercised in town or cities, whether for good or evil—yes, *far greater*. The individual stands out to scrutiny where men are few—his incomings and outgoings are known—his words and works are publicly canvassed. The influence as exerted by masters in the manufacturing and rural districts admits of no comparison. The relation is not nearly so intimate in the former as in the latter case. Would we have the working men of England as we wish them to be, we must be their practical monitors, as silent or as energetic as we please. An example of vice given by a class of men upon whom the poor and the too commonly uneducated are dependent for daily bread, affords a very wide margin to the vicious; while a good example diffuses a magic sunshine and happiness as far as it can penetrate. One such may exalt or deprave a neighbourhood!

My friend knew this well enough; and we shall see in the sequel what sort of light he tried to hold up, in that dark and dismal night into which he was cast.

F. R. S.

THE MANAGEMENT OF FARM LABOURERS.

(Concluded from page 146.)

Our observations hitherto have been principally confined to the past and present circumstances of the labourer; but the progress of science having at length reached his threshold with so many demands, suitable provision should consequently be made to meet his prospective wants, equally in behalf of the theory and practice of his profession, so to speak, as his moral and social *status* in society; let us, therefore, in accordance with such, take a prospective view of his management.

The greater amount of science now being brought to bear upon the soil and its products requires better educated labourers to carry it into practice. We have only to compare English agriculture with that of the continent of Europe and Asia to appreciate this; for the former has now the assistance of steam-engines, sowing, manuring, reaping, thrashing, and a vast variety of other machines; while the latter has almost exclusively, as yet, to rely on the "brute force" of its labourers. And there are yet, unfortunately, too many of this latter example among ourselves. Now differences so great as these obviously call for differences of mechanical knowledge.

Under brute force labourers do not experience the wants of those in situations where improved machinery and management exist, and, from their isolated and even secluded position, in many cases, have no notion of educating their families in mechanical science, much less of studying elementary works themselves during their leisure hours. Hence the consequences when their employers purchase a steam-engine and thrashing machine for the first time, or any other new implement to which they are strangers; for they not only endanger their safety—making bad work at the same time—but adopt a thousand erroneous notions more difficult to manage than anything else. We have often, for instance, had more difficulty in teaching the rustic mind what a machine should not do, than what it should, and how it should not be worked, than how it should; and the more mechanically gifted it is naturally, the more prone it is sometimes to run into extremes of this kind, although more easily informed afterwards. In short, such labourers have always a costly apprenticeship to serve, at the expense of their employers, whenever any progress is made in chemistry and mechanics, learning the first principles of those sciences at the instrumentality, so to speak, of a thousand blunders.

But how many small farmers are there, who just know as little about chemical and mechanical science as their servants, and who therefore have more need to be taught themselves than to teach others! Indeed, how can it be otherwise, in the absence of improved machinery and artificial manures on a farm? No doubt, in not a few cases the absence of such may be traced to the smallness of farms and the want of capital; but objections of this kind are daily becoming less tenable, for successful farming without the most improved machinery is fast becoming impossible.

This growing dependence of agriculture on these two sciences will be productive of two things, affecting equally both man and master; for, *first*, both must be better educated, and, *second*, those who are masters of those sciences will enjoy many advantages over those who are not, so that intellectual merit will receive its reward—different talents flowing separately in their respective channels, as it were, in connexion with agriculture, as the other arts where the subdivision of labour is carried almost to an indefinite extent.

So far as the rising generation is concerned, it will be an easy matter to reach their wants by the introduction of a proper course of instruction in every rural village, or other school, as has already been done, in many cases; but as this involves an increase of expense, the difficulty lies in getting it to harmonise with the pecuniary circumstances, improvident habits, and even ignorance of parents unable to appreciate the value of such a course.

Now, the obvious policy to pursue in a case of this kind is to remove difficulties out of the way as much as possible, and to adopt every legitimate means calculated to promote scientific education among our labouring population.

That something may and ought to be done here is manifestly true, and therefore exceptions in principle cannot be raised. Parties may differ as to the means; but, if agreed to the soundness of the proposition, experience ought to remove difficulties in the way of carrying it out. Any charitably-disposed person, therefore, may successfully commence operations of well-doing by removing the difficulties involved, and stimulating youthful minds to emulate each other in the progress of science; and this may be done by several plans already sanctioned by experience—such, for example, as prizes and bursaries, obtained by competition; free education, also by merit; and charity-schools. At all our Universities, for instance, there are numerous bursaries, or endowments, which enable many to attend their classes who otherwise could not; and why should not something of the kind exist for the benefit of a chemical and mechanical course of education to the families of small farmers and agricultural labourers? Were there only but a few in every school, it would secure a class of men qualified to take the charge of improved machinery as fast as introduced. And, besides being qualified for this, their example would be invaluable to others; cutting up by the roots the many prejudices still existing, in the lower ranks of life, to machinery and all sorts of new-fangled things directly or indirectly affecting them.

In the endowment of agricultural colleges and country schools, with bursaries for the above purpose, the greatest respect should be had to merit. Farm-labourers, although poor, are yet, for the most part, remarkably proud and independent in spirit; while small farmers are still more so; and therefore anything obtained by the merit of their boys would, consequently, be much more highly prized than if by solicitation or charity. And this noble spirit, so worthy of culture, will become more and more elevated with the growth of intelligence, giving to society a more dignified tone.

Seminaries for girls may also have bursaries for cookery, and other branches of domestic economy, now much neglected in the cottage of the small farmer and agricultural labourer. There is, perhaps, no other department that holds out such a promising field to the philanthropist as this, and where a greater amount of good could be done; for improvidence, with all its miseries, is too often traceable to ignorance in culinary and like domestic affairs.

The diversity of talent among farm labourers is as great as it is among farmers themselves, one having a turn for mechanics, another for chemistry, a third for zoology, a fourth for botany, &c. A farmer, for example, sent his son to be a lawyer, but the talent of the young man lay in a different direction; accordingly, at his father's death, he left the bar to be a farmer. His father's farm was on a hill-side, sloping to a small valley, in which a large river flowed, in one of our mountain districts; but farming, like the bar, did not prove itself to be the real sphere where his talent could best be seen. However, he soon had two water-wheels driving one thrashing-machine, to the surprise of his neighbours. The river already mentioned, made a large bend of a simicircle, contiguous to his farm; and one lucky day he discovered, that by opening a cut across this bend, a waterfall of a hundred horse power or so, with a regular supply of water summer and winter, could easily be had close to a canal. This was too flattering a concern to be lost sight of, and accordingly he lost no time in securing the lease of the ground, and erecting flour-mills, bone-mills, &c., and is now fast making his fortune as a miller. A second, after having failed as corn farmer, is making his fortune as a shepherd and store farmer, where a third would lose money for the want of his zoological talent. The chemical talent of a fourth is converting our barren heaths into fruitful turnip fields by means of guano, and marshy drowned soils by means of drainage; while a fifth is celebrated for the fine quality of his corn, pulse, and root crops. And as it is with farmers, so is it with their labourers; for they also have—one, a mechanical talent ever scheming to mitigate his toil by ingenious contrivances; a second, a talent for the management of live stock; a third never more successful then when in a dunghill, or manuring or top dressing, and draining land; while a fourth class exhibit their talent in the seeding, hoeing, harvesting, and dressing of corn, pulse, and root crops.

Where scientific classes have been properly established in schools, different talents will soon manifest themselves, so that they can be turned into their respective channels at once, without loss to either master or man, nay, on the contrary, very much to the profit of both.

The farmer or labourer, therefore, who does not give his sons a scientific education, hides their talents in a napkin as it were; hence the consequences, which daily experience brings to notice at present in the absence of such tuition—men of the highest mechanical talents naturally being confined in a ditch at twelve shillings per week, who might easily make twice and thrice the money, and be a better bargain to their employers, in superintending machinery. Many of them, after serving an apprenticeship to agriculture, relinquish it, betaking themselves to occupations more conducive to their natural inclinations; while those who remain are more difficult to initiate into the various manipulations of the art than they would be were they to receive a proper education.

Along with a scientific education, more encouragement to excel in the working of machines might be given in the shape of prizes and medals than is now done. At present, almost the only emulation which takes place is at "ploughing matches." Very lately, it is true, prizes have been given for draining, in a few solitary cases; but the practice, generally speaking, is an exception. Sowing, reaping, and thrashing machines are equally deserving of encouragement of this kind as the plough, and, were it given, would no doubt prove equally efficacious. The horseman, cattle-man, and shepherd, again, who have the charge of our prize horses, oxen, and sheep, have just as much right to prizes and medals as their employers, and often more. So have those who manage with equal success our piggeries, poultry-yards, and dairies.

Domestic economy, again, including the management of the cottage and garden, with a pig and poultry, where kept, is equally susceptible of being rewarded by prizes and medals as the labours of the field. Even the rearing and nursing of children, so far as physical science is concerned, is as capable of being rewarded as the rearing and nursing of cattle, and equally deserving of it, if not more so; successful management in the one case having nothing to do with morality, any more than the other.

Of social duties between man and master, and masters and servants among themselves, there is also a large class which belongs to physical science, and therefore falls under the influence or control of physical laws. Nothing can be more absurd than to deny to merit her just rewards in all such cases. A ploughman, for example, lies under a moral obligation to his employer not only to make good work, but also to exercise a general care for his interest; now it is not for the morality involved in this transaction that he is rewarded, but for the quality of the work itself and the profits arising from it; and, for a similar reason, it is not for the moral duty the cottager's wife lies under, to nurse her children successfully, that she should be rewarded, but for "the chemistry of common life" she displays in the doing of it. In this case the farmer, ploughman, and his wife, may all three be notoriously immoral characters, and yet discharge the various physical duties they owe to one another with the greatest circumspection. Farmers, again, may reciprocate among themselves, in accordance with the familiar old maxim, that "one good deed or favour deserves another in return," and so may servants; and to place temporal actions of this kind beyond the reach of temporal rewards, is to sacrifice both the moral and physical welfare of society involved.

At all our schools, again, prizes are given for "general good conduct," which obviously involves morality; and if this is prudent and practical in classes at school, why should it be otherwise during the apprenticeship of the farm labourer, or even after he is master of his profession? In short, however difficult it may be to estimate the value of morality apart from physics, so as to bestow upon it its just reward, and however necessary, therefore, it may be to confine rewards to the latter, it will yet be found, in practice, that few sensible successful farmers overlook the value of either in the management of their servants, and therefore that the necessary means should be used for the cultivation of both.

THE ORIGIN AND GRADUAL IMPROVEMENT IN THE PLOUGH.

While in countries of warm climate, where the soil is quickly dried after a wet season, the plough has preserved its slender primitive form, under our atmosphere of clouds and showers it has grown into a massive and complicated implement. The coulter, mould-board, and supporting wheels, "known," though scarcely common, in ancient Greece, became necessary in Saxon and Norman England. Our ancient ploughs, having a wet, tough soil to break up, were obliged to cut a regular furrow slice, leaving a furrow with a horizontal bottom; and the task of turning over this tough piece exercised the rude ingenuity of the early "plough-wrights." In the fifteenth century there were many varieties of make, to suit lands of different quality. Thus, in Somersetshire the body of the plough was very long, with a broad and thin sole, to prevent its sinking in very stiff ground; in Hertfordshire and Norfolk, on the contrary, was a short plough, having in front a gallows with two wheels, and a draught-chain. At a later period, almost every county had its own fashion of share and mould turners; the peaty fen country had its broad, sharp share and "skeith," or revolving coulter; whilst the Kentish clay yielded to the force of a ponderous "turn-wrest."

On very light land it is not so much mechanical tillage as abundant manuring that is the principal agent in producing crops; so that our observations will mainly bear upon the culture of loams and clays. Where the plough can turn up only a thin staple of loose, weak sand or peat, or flinty loam, the pulverisation of the soil becomes almost a secondary point to the preservation and even increase of its tenacity: hence the great value of the presser and roller upon such land, the prevalence of broadcast sowing, and the endeavour to perform as much as possible of the tillage without the plough, which always lightens and turns over, whether the ground needs it or not.

It appears that the plough, after having been transformed from a scratching into a furrow-turning implement, and after having received all kinds of additions in the shape of "shield-boards," "wrests," and other diversities of framing, to suit its working in friable, sticky, or hard earth, has at last come nearer to the regular and gradual form of a screw. In fact, it has been entirely changed from its original design, and the share and mouldboard may be described as constituting the blade of a screw for cutting and partially turning over a square-cornered slice of the ground it is drawn through. On light soils, the plough breaks the ground, and to some extent pulverizes it; thus causing the horse-implement to approach in some degree towards the manual spade, which, for economy's sake, it has displaced. But it only *prepares* a tenacious soil for pulverization, merely turning it up with great labour, much of which is wasted in overcoming the great friction always attached to a screw-motion. If a stratum of considerable thickness is to be reduced into a reasonable state of fineness, in order to fertilise and clean it (as in fallowing), a second ploughing is necessary, crossing the first furrows, which were turned "in a whole piece." By this they are not thoroughly divided, but are driven up into great slags, lying in all postures; and to effectually reduce this—ragged and indurated as a Giant's Causeway—requires an untold amount of dragging, harrowing, rolling, and clod-crushing, each task watchfully performed at the critical moment allowed by rain and sunshine. Could horses have worked an implement capable of cutting up and inverting like the spade, with how much less labour and time would this reduction have been effected! But no such tool has been forthcoming. As we might expect, the plough, being the fundamental implement, and the very best that could be devised *for certain purposes*, has been applied to almost every other tillage operation beside that of breaking and turning over whole ground. Did our bean stubble, and other foul ground, require paring in the autumn? it was *turned over* with a shallow furrow. Did our fallow need stirring in spring? it was *turned over* by cross ploughing. Had the same ground to be loosened after the grinding and couch-cleaning of its surface? it was again *turned over* by the plough; and so on, many times. The plough was used for every operation it could possibly perform, whether suited to its capabilities or not—even horse-hoeing was first performed by the plough. But so far from being well adapted to all these different processes, it was long ago found to be amazingly imperfect and unsatisfactory on some lands, even for its own peculiar office of cutting and *turning over*. Thus, Jethro Tull, perceiving the ill consequences arising from an undue size and solidity of the first furrows on strong land, constructed a "four-coultered" plough, which cut the slice into four stripes, and these in turning fell into numerous broken pieces. This wonderfully facilitated his work of rapid and fine pulverization. After him, Mr. Duckett, a Surrey farmer, observing the injurious action of the plough-sole upon the subsoil, contrived a deep trenching plough, and another with two shares, fixed one above the other; and by the occasional use of these deeply-rooting implements, obtained a better subdivision, as well as changing and mixing his soil. Mr. Greg, a Hertfordshire farmer, next began to abolish dead fallows; and, proceeding upon the principle that fertility was to be derived from pulverizing the soil, clearing it of water, and keeping it clean, resolved to cultivate his strong clay land by practising the then new "row culture," his rule being to *plough only once for a crop*, instead of four or five times, as before; to plough only in winter; and to use the horse-hoe. By this means, and by employing a scarifier, in place of the plough, for spring and summer tillage, he successfully replaced the old course of bare fallow, white corn, pulse or clover, by a six-course shift of turnips, barley, clover, wheat, beans and peas, wheat. General Beatson, again, thirty years ago, overcame the supposed necessity of repeated ploughings, on a very tenacious clay farm in Kent. Instead of beginning a fallow by burying under immense clods the seeds of weeds that had fallen on the surface, and being obliged to reduce the enormous masses of hard earth by the common process, he determined to break and crumble the surface without turning it over, to burn the weeds, and to stir the ground to any requisite depth by the tines of a scarifier which he invented for the purpose. His peculiar method of culture, which he successfully pursued for several years, is detailed in his "New System of Cultivation," published in 1820; but one of the principal points was his broadsharing and scarifying the stubble of every corn, tare, bean and pea crop, and raking and burning the roots and rubbish so collected. The plough, so far from being his chief implement, was found useful only in quite secondary operations.

The introduction and uses of grubbers and cultivators, designed to supersede the plough in some cases, and to improve its work in others, is so important a topic, as to demand further consideration, particularly as this class of implements is not even yet sufficiently appreciated in many districts,

THE PROCESSES REQUISITE FOR RENOVATING THE SOIL.

In accordance with our previous intimation, we now proceed to review the processes requisite for renovating the soil; and in so doing we shall first consider the proposition in relation to the three modes of application now most advocated for that purpose—viz., the general and ordinary mode, long practised, of manufacturing manure in open sheds and yards, by feeding out the produce, and by treading down the surplus straw of the farm with cattle; by feeding oxen in close boxes, and suffering the manure to accumulate beneath them; or by keeping them upon latticed floors, and combining their excrements with a large quantity of water, to be applied in a liquid state by means of pipes and hose upon the surface of the land. As much discussion has arisen upon this subject, it will be needless to advert to it further than by general observations, by way of elucidation.

A moment's reflection will convince any dispassionate investigator that neither of the three processes can have any decided advantage over the others, so far as the deposits of the animals themselves are involved. The question mainly to be considered is, whether the admission of moisture during the process of making the manure is advantageous or not. This point has not been hitherto solved by any of the writers upon the subject. Mr. Mechi asserts that the liquid system of application is best; but he has never shown clearly how and why it is so; for it is well known, both from his own statements and those of others who have investigated his system, that, in addition to the deposits of the animals themselves, large additions of animal substances are from time to time made, and that guano is also added in large quantities for the same purpose: therefore, it will be seen at once that an experiment, if it can be so called, amounts to little, so far as the economy of the application is concerned. Of its efficacy, to a certain extent, no doubt has ever existed.

In the experiments reported by Lord Kinnaird, in the Royal Agricultural *Journal*, vol. xiv., part 2, page 338, we have the same difficulty to surmount, as regards the value of manure made under a covered homestall or in an open yard. It is very true that he shows that the manure made under the covered homestall exhibited a decided advantage over that made in open yards, to the crops to which equal quantities of each had been applied. This would be a consequence certain to follow, if the *strength* of the manure was the desideratum; but the question to be solved is, whether the manures made from a given number of bullocks of the same size, fed in the same manner, and applied to the same portion of land, would produce a similar result. We have an opinion that they would not, but that the manure made in open yards, being the largest in quantity, would therefore, if all applied to the same space, manure the land more beneficially than by either of the other processes. This is presuming, however, that the buildings of the open yards had been well contrived, with proper water-spouts to carry off the superfluous water, and that the deposits of the animals had been entirely secured by the fodder applied.

Mr. Mechi argues that manure cannot be taken up by plants until it is reduced as regards its solubility, so as to enable them to make it subservient to their sustenance, by the assistance of their roots. This is very true; but it does not prove that raw, liquefied manure, after all, is better in its crude state than solid manure, partially decomposed at the time of application, and gradually becoming decomposed as the season advances, and the plants are also progressing in growth. So far as experiments have been made upon a small scale, we are decidedly of opinion that the liquid application made to the surface is neither so economical nor so beneficial as when applied in a solid and partially-decomposed state; and we have been the more convinced of that fact upon observing the effect of liquid manure, when applied too liberally or of too-great strength, as it is then found to have a tendency directly contrary, and ultimately to destroy the plants to which it is applied, especially if the weather proves hot and dry at the time of the application. Some plants, however, are such gross feeders, that it becomes exceedingly beneficial to them, and contributes to their development and growth in the most efficacious manner. Plants of the brassica tribe, mangold wurzel, potatoes, grasses (especially Italian ryegrass), quickly absorb it into their system; but the cereals and legumes do not so well succeed by its application, especially if applied during the summer months. And as regards the economy of application, although in some instances it may be conveyed to its destination by its own gravity, still the large application of water necessary in its combination must tend to make it extremely bulky, and unfit for general application.

As regards ordinary farmyard manure, and that made in covered homestalls, the former is far more bulky than the latter, and consequently more expensive of application; but, on the other hand, should it be inconvenient to make the application direct to the land, when the latter is removed from the homestall, it runs so quickly into fermentation, that much of its manuring property is sacrificed, unless very great precaution is taken to prevent it by combining it with large quantities of earth, and thus securing the ammonia as it becomes developed.

With ordinary farm-yard manure, two methods are adopted to reduce it to a proper state for application, the one by carting it out into large heaps and turning it over, by which an active and powerful fermentation is obtained; but by the same process that it is reduced to a soluble state, a large proportion of its most valuable constituents is evaporated and lost; and as this decomposition is to a certain extent absolutely necessary to the production of turnip crops, it may be carried out with much greater advantage if the dunghills when turned over are covered with loam or tender clay, combined with vegetable mould: these substances will arrest and fix the ammonia in its endeavour to disengage itself; and if a coating of gypsum is also applied, it will fully repay the cost.

For bean and pea crops, and even for oats, a direct application of it is best; and even as a top dressing to clover and grasses intended to be fed down during the summer months, it is most economical to bestow it where most required in the first instance. Some difficulty, however, arises, in distributing that which has been made under covered homestalls evenly, as by the treading of the animals it becomes consolidated to such an extent as to render it difficult to be spread equally, unless considerable extra labour is bestowed.

What we have remarked as applicable to manure of the latter description, applies to manure produced by each separate animal, under what is denominated the box system: the manure becomes still more highly concentrated than by any other mode, and consequently is more limited in quantity.

Every system has its advocates, and unfortunately prejudice so warps the understanding, that it becomes more and more difficult to obtain a true result, whenever the subject is mooted by opposite partizans; common sense, however, comes to our aid, and by its assistance we may be able to decide whether a highly-concentrated manure is more valuable than one otherwise composed. In the latter case, the extra labour bestowed upon its application, however, becomes a set-off, to a certain extent, against it. The quantity of fodder necessary to keep open yards well supplied is another consideration. Upon farms strictly arable, the economy of fodder is immaterial, as the covenants of most leases, as well as custom, establish the right of the landlord to the straw, and the tenant in such cases is prohibited from converting it by sale or otherwise, and therefore is reduced to the necessity of treading it down with cattle; and it is not long since that farmers congratulated themselves, upon rain falling in large quantity, that it increased the *muck heap*; but we begin to hope that such ignorance is fast disappearing.

There is a system prevalent in most counties of applying large quantities of manure by way of a top dressing to young clovers and grasses, and not only to them, but with the most beneficial results to the succeeding wheat crop—although it may appear at first sight a most wasteful application; practice, however, establishes it as a point of good husbandry, not only as regards the clover crop, but the succeeding wheat crop also. It is considered one of the most certain preventives of mildew; whereas a direct application of new unfermented dung would as certainly induce it.

We shall now advert to the principles of manuring, as carried out by the application of inorganic and mineral substances, which act by supplying some deficiency in the soil, or, by combining with other substances, produce a chemical action, which during its development renders the soil more productive and more easily cultivated. Of these substances, the one first and most generally applied was marl, either distinct, or, as is generally now the mode, in combination with alumina or clay. It is not our purpose to enter into a description of this substance, as a reference to any text-book upon soils or minerals will afford a ready description. It is necessary, however, to remark that throughout the edge of the chalk districts it is found more or less in combination with the chalk clay, known to geologists as plastic clay; consequently in very large portions of the kingdom southward, and also extending from west to east, it is found more or less to abound. Throughout the counties of Kent, Essex, Suffolk, Norfolk, Cambridgeshire, and Hertfordshire, its application was general at a very early period, throughout the whole of the sixteenth century; large woods have, however, succeeded arable fields, and huge oaks have long succumbed to the stroke of the woodman, in which marl, or as provincially denominated, clay pits, have been made. The first application of it had a surprising effect upon arable land, rendering it highly productive of grain, especially wheat and barley crops, for many successive years; until from repeated cropping, without the necessary application of manure to supply the land with that which these crops had been yearly exhausting, much of the land reverted to its original state of poverty, and was again converted to woodland; and during the period succeeding the American war, the price of wheat had fallen to such an extent as to induce the landowners to let the land run to grass, or to become clothed with underwood and timber.

THE CONDUCT OF THE PERUVIAN GUANO TRADE.

Sympathy with the distressed or ill-used has ever been one of the distinguishing characteristics of the English nation. It is acting on this that our people are now suffering so severely, and needing themselves so much sympathy from their countrymen. Did we not know how strongly this feeling is imbued in us all, we might hesitate ere at such a time we ventured to distract the public attention from those calls of humanity which now more immediately interest and incite us. The exigencies of war, however, must cause such scenes and hardships as those we daily hear of to be more or less inevitable; whereas the horrors we are about to denounce trace back to no stronger necessity than the wanton cruelty of over-grasping cupidity.

Since the first discovery of its uses, the Peruvian guano trade has never been in a satisfactory state. Conducted only with the narrowest view to self-aggrandisement, confined in every possible way so as never to come within the limits of open commerce, the almost inexhaustible stores at command have never yet been fairly called on. It is only natural that such should be the case. When we witness the extraordinary pains taken by the Peruvian Government to confine their business to a close market, no wonder that the supply will not equal the demand. Such a line of policy, however, must eventually extend even beyond this. For a time it may be all very well for Peru and its agents to say, We choose to send in so much, and mean to have such a price for it; but it never seems to have struck them that the continuance of such a system may very possibly result in their being able to send comparatively little or none. The great guano deposits are still kept strictly in the hands of the Peruvian Government. They alone work them, and on such a plan that can only lead us to hope, and even expect, that within a very short period they will be without the means to work them at all.

"The horrors of the guano trade" have now for some time been gradually revealed to us. They have at length been so distinctly spoken to as to render it a duty at once to denounce them. We say boldly that it will be a disgrace to the character of this country if such outrages are suffered to continue—if not to be indirectly encouraged. We shall assume that the evidence we are about to call can be relied on. We do so not merely from the air of truth and honest indignation with which it is given, but from the multiplicity of corroborative testimony which might be brought to confirm it. We have here a respectable house as the authorized agents for Peruvian guano; we have our own ambassador in that country; to either of these, as to our own Government, would we seriously address ourselves. Can the atrocities we refer to be contradicted? If so, let the Messrs. Gibbs at once look to it. If not, they can never be justified, and the matter becomes one something beyond a mere consideration of profit and loss—of what either Peru may make by the sale, or England by the purchase of guano.

In the *Morning Chronicle*, of just a week since, appeared a letter, detailing the experience of a gentleman who was surgeon of a ship "which lay off the Chincha Islands during a period of three months." In this time his mind was gradually prepared for the horrors he was ultimately allowed to witness. Let his own statement, as given to the friend who writes for him, show what these are:—"The Peruvian Government have decoyed from the coasts of China some hundreds of Chinamen (about 600, I believe) with bribes of 40 dollars a-piece per annum; for this sum they are apprenticed to the Government for a period of five years. The misery which awaits them may be comprehended when I state, on the assurance of my friend, that not one Chinamen has ever been known to return from these islands, and that it is notorious that they seldom survive three years after their arrival. When they arrive they are stripped stark naked, their shaven heads and bare feet being allowed no protection. They are placed in gangs, who work under the eye of a taskmaster, armed with a stick about an inch in diameter, resembling an unsplit bamboo. They are compelled, each man, young and old, strong and weak, daily to work five tons of the guano, and wheel it towards the shoots. Their labour is spurred on by the blows of the taskmaster, inflicted with his main strength; and should any of the unhappy creatures come short in their work at the close of the day, a more systematic flogging with strips of raw cow-hide ensues, each stroke of which raises the blood, while the guards of the island surround the culprit, playing on drums to drown his screams. This would seem to be an exaggerated statement; but my friend assures me that he has continually been on the island, has seen the violent blows of the taskmaster, and heard the drums beating while the more savage punishments were occurring. He has seen their bodies wealed with blows, and their limbs burned into holes by the corrosive soil."

This is the means by which a Government, in the exercise of its wisdom and justice, contrives to keep a trade quite to itself. We have already said it can hardly be expected to last. Let us proceed a little further in support of this opinion, and see in what such a system is already resulting :—

"Now, one of the chief duties of the guard is to prevent suicide; the poor wretches are not allowed now to approach the shoots, because so many have hurled themselves over with their cargoes (the shoots are about 100 feet high); they are never allowed to approach water, lest they should drown themselves, but a quantity is served out to them daily; yet, notwithstanding all these precautions, suicide is constantly occurring. He has seen, on landing, three suicides hanging in a row, and has seen the bodies of those lying on the beach who have flung themselves from the cliffs. He says that a settled despair is on their downcast countenances—that their frames gradually become like walking skeletons, however healthy they may have been on landing."

There is only one hope left, and that one fails us. The evil, after all, may be but an abuse of delegated power, and the Government as yet unaware of what is going on under its name and flag It is thus that the correspondent of the *Chronicle* destroys so charitable a supposition :—

"The Peruvian Government must know pretty well what an outrage to civilization and Christianity is here occurring, as they allow no boat to be moored near the island, no one to approach it without special permission; and when any one is on the island, he is not allowed to speak to one of these tormented slaves. My friend could only gain access to the island by stating his business with the governor, and always had to give this account of himself to the sentinel at the head of the shoot. Can any dream of horror, any tale of fiction, equal this scene of 600 naked men thus bound to a burning soil—thus lashed to work—thus struggling only for death? Negro slavery is nothing in comparison; there family affection and a home, however insecure, may alleviate their bitter lot. But this picture seems to realise a state of torment which we could hardly have conceived it possible for man to enact against his fellow-man."

We might quote the whole letter, but the facts are already strong enough to speak home to the hearts of us all. Whatever benefit we may derive from the use of guano, we have little thanks due to those who supply us. The whole conduct of their business has been mean and selfish, without one liberal act or intent in acknowledgment of the revenue they receive from this country. It has now reached to something beyond this, and perhaps, after all, but naturally enough. A mean, selfish, grasping spirit rarely hesitates by what means it achieves its ends. It has been precisely so here. Had the guano trade been thrown open, with a royalty charged on every freight taken, we should have heard of no such scenes as these. Come what may, it is the duty of us all, whatever our sympathy may cost, that we should no longer pass them in silence or unnoticed. The gentleman who volunteers what we have quoted is willing to substantiate his statements. Surely he must be called upon to do so; for modern history furnishes us with no such outrage upon humanity, as the systematic atrocities which continue to be perpetrated under the sanction of the Peruvian Government.

ON DISCOVERIES OF SCIENCE.

In the progress of most sciences, the discoveries by which they are advanced are not always the rewards of those who have been their oldest students. This is naturally enough the cause of some vexation to those who have long toiled in one even course, and have not perhaps gathered either laurels or riches. Our readers will remember many instances of these irregular successes in life. They will think of Blake, the great admiral, who was a soldier, taken from his regiment to command fleets, and who taught his sailors to conquer where no admiral before him had dared to lead. Then, too, amongst soldiers, Cromwell was bred a brewer; Clive a clerk in the service of the East India Company. And who first enabled the most skilful to conquer in battle—who banished mere brute force from the field—who produced gunpowder but a cloistered monk? Did a sailor invent the mariner's compass? Did not a Scotch student, Clark of Eldin, first instruct Rodney how to win battles by teaching him to break the line? But let us not encircle all the sciences in our glance—let us descend towards agriculture, the most valuable of them all—let us trace some of her footsteps, mark a few only of her triumphs. Ask her historians who were her sons who will in England go down to all time amongst the benefactors of their race?—who was Jethro Tull? of what profession was Menzies, the inventor of the thrashing machine? Were they not both barristers? Did not Lord Townsend introduce field turnips into Norfolk? and was not a learned physician the first advocate of the growth of mangel wurzel? These reflections, as to what such men have accomplished, might surely prompt us to listen with interest to the suggestions of all men of ability, although they may have perchance been educated to a profession very different from our own. Such energetic persons, indeed, start with some advantage in almost every fresh pursuit to which they direct their attention. Their progress is little retarded by any preconceived notions—they have no faith in the oracular wisdom of ordinary dogmas—they believe all things capable of improvement—they make the attempt in consequence of that conviction, and to try is in many cases, we all know, the half-way house to success. It was ardent efforts like these which have given the farmer many a powerful agent. It was some daring sailor—some long-sighted merchant, who, in our time, first brought him the guano of Peru; it was the chemist, labouring in his laboratory, who gave him, with many other valuable manures, superphosphate of lime.

Such reflections as these should, we repeat, prompt us to hold forth the helping hand to every man who is advocating the improvement of agriculture, without, on all occasions, stopping to ask in what school he was educated, or even the size of his farm. We confess that we are the more anxious to gather information from all sides, since we feel that, so long as the population of our country continues to increase at its present rate, so long will fresh efforts be expected and called forth, and larger harvests reaped by the tillers of its soil. Does not the experience of ages tell us that the population of this country, and a consequent enlarged production of food, have long gone on increasing? It is very instructive to follow this great onward wave, if only during the last century. Taking, then, the population as being equal to the consumption of the same number of quarters of wheat, or what is the same thing, allowing one quarter of wheat per annum as the food of each person, we find that in the year 1740, when Jethro Tull was labouring to introduce his drill and horse-hoe husbandry, the annual produce of wheat in England and Wales may be estimated to have been about 6,064,000 quarters. Another thirty years brings us, in 1770, to the days of Arthur Young, and to the dawn of modern agricultural improvements; then we find the annual produce of the kingdom increased to 7,428,000 quarters. Another generation witnessed, before 1801, the general introduction of the Norfolk husbandry, and a greatly-improved system of farming. In that year, according to the first regular English census, we may regard the annual produce of wheat as having increased to 8,331,434 quarters. Now came rapidly forward one triumph of English farming after another, and nearly as fast as the population increased, so enlarged the farmer's produce of wheat. We find this produce amounted, in the year 1831, to 13,897,187 quarters, so that, large as was the increase of the population, it was hardly greater than the unwearied efforts of the English agriculturist. Science had now dawned upon the farms of merry England—Coke had successfully laboured in elevating the profession—he had converted large sandy heaths into wheat fields. Davy had aroused that taste for science which will long continue, we feel well assured, to add more and more grain to the farmer's stackyard. The last census, after an interval of only twenty years, tells us that the increase of food is still going on, and that in 1851 the yearly consumption of England and Wales may be considered equal to 17,905,831 quarters. It is an erroneous conclusion that the correctness of this view of the increasing productiveness of our soil is materially disturbed by the amount of our imports of foreign corn. It was certainly not the case in the first forty years of the present century, for we find that the average imports into England of wheat and wheaten flour, reckoned in quarters, was, upon an average in the ten years between—

1801 and 1810	equal to only	600,946	quarters	per annum.
1811 to 1820	"	458,578	"	"
1821 " 1830	"	534,992	"	"
1831 " 1840	"	907,638	"	"

It is true that the average import from 1841 to 1853 has been about 4,066,339 quarters; but, even supposing that this was all consumed in England, and that four millions of her inhabitants are supported on foreign corn—even admitting, for the sake of argument, this improbable fact—yet, even then, we may ask who finds corn for the other fourteen millions but the same farmers whose predecessors, in 1801 (with wheat averaging 115s. a quarter), could not find food for 8,331,434 inhabitants? What useful conclusion, then, may we perhaps all derive from tracing the mere outline of this great onward movement—this advancing stream of population, and this side by side increase of the means of its subsistence? Does it not, amongst many other useful conclusions, warn us to beware how we undervalue the suggestions of the uninitiated—the discoveries of men in the ranks of other professions? Should we not, on the contrary, however we may sometimes be startled by the zeal of a proselyte, or the somewhat terse ridicule of the enthusiast, rather more wisely reflect that under such an (to us) uninviting exterior may be perchance contained important truths—novel information, alike valuable to England and to her great farmers?

TITHE COMMUTATION SEPTENNIAL AVERAGES.

SIR,—On the 8th instant I communicated to you the result of the septennial averages to Christmas, 1854, as deduced from the return published in the *London Gazette* of the 5th instant—

Wheat..........6s. 0¾d. per imperial bushel
Barley..........3s. 7¾d. ,,
Oats ....2s. 6d. ,,

And that each £100 of the tithe rent-charge for the year 1855 would amount to £89 15s. 8¾d.

Several communications have been addressed to me expressing surprise that the value of the rent-charge should have gradually decreased since the year 1849, while the price of wheat has gradually increased during the same period. In order to show that this may be explained, I must draw attention to the mode in which the question of tithes was settled in 1836.

It was enacted by the 57th clause of the Tithe Commutation Act (6 and 7 Wm. IV., c. 71) that the amount of the rent-charge, as awarded or agreed upon, should be divided into three portions, and that every tithe rent-charge should be deemed to be of the value of such number of imperial bushels and decimal parts of an imperial bushel of wheat, barley, and oats, as the same would have purchased at the average prices for seven years ending Thursday before Christmas-day, 1835, in case one-third part of each rent-charge had been invested in the purchase of wheat, one-third part thereof in the purchase of barley, and the remaining one-third part in the purchase of oats.

In conformity with the above, we find that £100 expended in wheat, barley, and oats, would have purchased the following quantities, at the average prices for seven years to Christmas, 1835, as fixed in the *London Gazette* of 9th December, 1836 :—

	Imp. bushels.
One-third, or £33 6s. 8d. in wheat, at 7s. 0¼d. per imperial bushel, is equivalent to	94.955489
One-third, or £33 6s. 8d. in barley, at 3s. 11½d. per imperial bushel, is equivalent to	168.421052
One-third, or £33 6s. 8d. in oats, at 2s. 9d. per imperial bushel, is equivalent to	242.424242

It is therefore clear that the rent-charge was not a fixed money payment of £100, but only such a sum as the above quantities of wheat, barley, and oats are equivalent to, according to the average prices for seven years to each preceding Christmas.

The septennial averages as published in the *London Gazette* may be shown to be correct by the following statement of the annual averages :—

	Wheat per imp. qr.		Barley per imp. qr.		Oats per imp. qr.	
	s.	d.	s.	d.	s.	d.
1848	50	6	31	6	20	6
1849	44	3	27	9	17	6
1850	40	3	23	6	16	5
1851	38	6	24	9	18	7
1852	40	9	28	6	19	1
1853	53	3	33	2	21	0
1854	72	5	36	0	27	11
	7) 339	11	7) 205	2	7) 141	0
	8) 48	6	8) 29	3	8) 20	1
Average per imperial bushel ..	6	0¾	3	7¾	2	6

The year 1847, which in the above account is replaced by the year 1854, was, in consequence of the scarcity which then existed, one of high prices, and particularly so as to barley and oats, viz.—

1847—wheat, 69s. 9d.; barley, 44s. 2d.; oats, 28s. 8d. On comparing these amounts, which are excluded from the seven years, with those of 1854, which are added, it will be evident that the septennial average must necessarily be less than in the preceding year, although the price of wheat was a little more in 1844 than in 1847.

We have seen that the £100 rent-charge was, from the passing of the act, to be represented by a certain number of bushels of wheat, barley, and oats; therefore, if we value these bushels by the septennial average prices, as fixed in the *London Gazette* of the 5th inst., we shall find the value of £100 of tithe rent-charge for the year 1855 as follows :—

	Per imp. bush.		
94.955489 bush. of wheat, at 6s. 0¾d.....	£28	15	8
168.421052 ,, barley, at 3s. 7¾d.....	30	14	0¼
242.424242 ,, oats, at 2s. 6d.	30	6	0½
	£89	15	8¾

I hope the explanation I have given will enable any one to satisfy himself, at any future period, as to the accuracy of the valuation of the tithe rent-charge, as well as of the septennial average prices of wheat, barley, and oats.

It may be of some use to the owners of tithe rent-charge to be aware that by the 20th section of 3rd Vict., c. 15, the half-yearly rent-charge, which becomes due on the 1st of January, is to be regulated by the averages published in the month of January in the preceding year, *not* by the averages published a few days after the said 1st of January.

I remain, Sir, your most obedient servant,
CHARLES M. WILLICH,
Actuary, University Life Office.

25, *Suffolk-street, Pall-mall, Jan.* 23.

BOOTS.

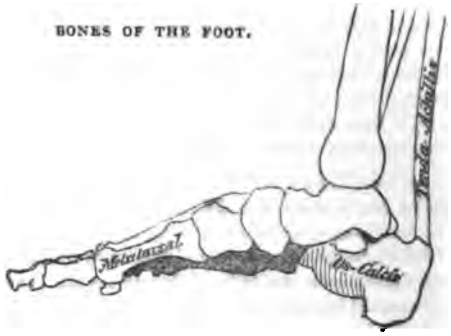
There is, perhaps, no other article gives the farmer so much occasion to grumble as his boots; and what is true of him is equally so of persons exposed, as he is, to all sorts of weather and circumstances—such as the ploughman, shepherd, soldier, policeman, &c., &c. The reduction which has taken place in the price of leather, owing to cheaper and more expeditious modes of tanning, may have lowered prices, but we question very much if the annual family bill has been anything less on that account; while corns and bunions have been vexatiously on the increase. Frost, snow, and sleet during winter, with the scorching suns of summer after walking among corn and grass fields in dewy mornings, are circumstances requiring the best of leather, workmanship, and construction, which very few farmers receive; while shepherds and soldiers are even many degrees worse. Hence the consequences experienced—making country-people proverbial for their awkward plodding gait, and committing more havoc among soldiers when called into active service than the guns and bayonets of the enemy; indeed, the moment we practically approach the facts of the case, that moment the conduct of St. Crispin becomes subject to serious animadversion.

We have been led to offer a few observations on this subject in consequence of the dependence of health at this season on comfortable feet, of the general calamity of bad shoes and leather, and of some experience in the patent elastic boots of Mr. Dowie, of the Strand, whose successful labours to improve the construction of boots and shoes, so as to meet the wants of the human foot, are deserving of favourable notice. This improvement consists of an elastic "waist" or sole under the instep, between the heel and tread, which accommodates the movements of walking or other kinds of pedestrian exercise; and from its elasticity permitting of the elongation of the sole, in conjunction with the elongation and bending of the foot, as will subsequently be more fully shown, the reduction in the tear and wear considerably exceeds the increase of expense. In other words, we are both more comfortable and cheaper with the elastic boots than the old non-elastic ones.

Our subject involves, *first*, the wants of the foot; *second*, the erroneous construction of boots and shoes at present, and their total unfitness for the purposes for which they are made; and, *third*, the adaptation of the elastic waist or boot.

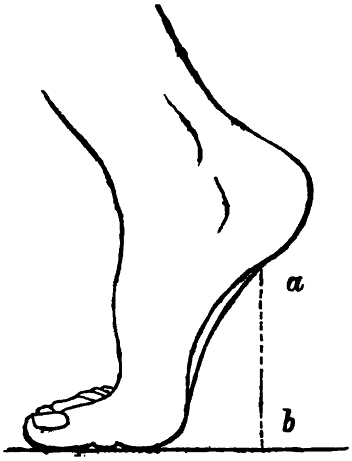
There is not a medical writer, to whatever department he may have more particularly directed his pen, who has not traced to the injuries of the foot from bad boots and shoes many of the most afflicting maladies to which the human body is subject. This arises from the sympathetic action between the feet and the lungs, nerves, eyes, and other vital parts. On this proposition, therefore, we need not enlarge, for progress in the science and practice of boot-making is as absolutely necessary as in any other art; so that those who do not join in the march of improvement must abide by the consequences.

A cursory glance at the anatomical structure of the foot will best shew its general wants; and the following diagram, to those of our readers not familiar with its physiology, will illustrate this more successfully than any amount of writing:—


BONES OF THE FOOT.

The foot consists, it will be perceived, of three classes of bones: viz., those of the tarsus, metatarsus, and toes. The former, seven in number, are—the os-calcis (or heel-bone), astragalus (that on which the tibia or shin-bone is seen resting), the navicular-bone, cuboid-bone, and three cuneiform-bones forming the instep; the middle class between the instep and toes includes the five metatarsal bones forming the tread, or broad part of the foot, marked on the diagram; and the toes consist of fourteen small bones, making twenty-six in the foot. All these bones are articulated and braced together, the articulations of the toes being longitudinal, but those of the tarsus and metatarsus both longitudinal and lateral. The tarsal and metatarsal bones together form a compound arch, being curved both longitudinally and laterally also, and possess great elasticity; so that the foot is considerably elongated under the weight of the body when resting on one, but still more so in throwing this weight forward from the one foot to the other over the tread, or rather toes, in walking, while this elasticity adds the *sine* (*a*, *b*) of the angle which the bent foot makes with the ground to the radius of the leg, as seen in the following diagram: a fact of the highest importance in the anatomical mechanism of the bones of the foot.

All the articulations of the bones we have just mentioned are covered with cartilaginous membranes, and lubricated with synovia (an unctuous fluid or joint-oil), from numerous glands; and those of the tarsus and metatarsus are so braced together by ligaments and



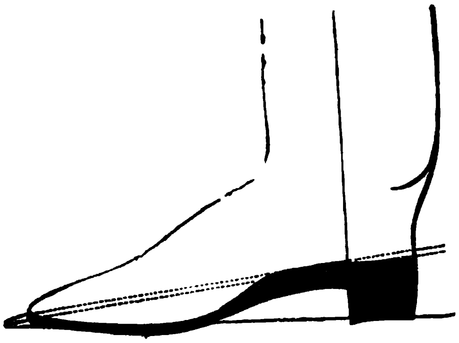
muscles as to give them the mechanical characteristic of one solid elastic bone of great strength. Among these again are situated the blood-vessels, lymphatics, and nerves—the whole forming, when covered with skin, an apparatus of the highest order, exemplifying the workmanship of an unerring Artist.

The quality of bones, cartilage, muscles, &c., &c., of the foot, again, is very different at different stages of growth. In childhood and youth, for instance, they are soft and more easily injured from any extraneous pressure, as badly constructed shoes; while in old age, although harder, the articulations are less pliant, while the fluids at the two extremes of life are also different.

And, lastly, the healthy and uniform growth of the different members of the foot can only be attained and preserved perfect by exercise; and the development and strength of the muscles of the leg are also dependent upon the free and unrestrained action of those of the foot. Exercise not only thus unfolds the whole muscular system, but keeps up the circulation of the fluids and animal heat to the lowest extremity, renewing daily the continual waste upon the living organism. In this respect healthy bone is as dependent upon exercise as healthy muscle or blood, all being subject to daily waste.

Such is, very briefly, the anatomical structure of the human foot; and it will at once be perceived that its wants in the various positions in which it is placed in the active duties of life are imperatively demanded to secure its welfare and the general health of the body. It may justly be said to be man's foundation; so that, if faulty, the whole superstructure is in danger; as is the case under our present system of boot-making; involving our second proposition, viz. :—

Boots, as at present constructed, sacrifice the functions of the foot; and, hence, the health and vitality of the whole system. The following two diagrams will illustrate this: the first showing an erroneously-constructed boot, and the second the distorted foot it produces :—

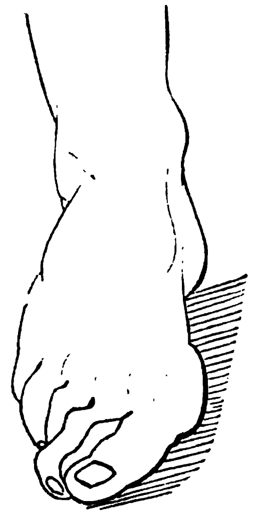


High-heeled and rigid-soled boot.

1st. The boot in question is high-heeled with a rigid sole under the whole of the tarsal bones. Under the articulations of the toe and metatarsal bones it bends a little, sometimes remaining in a bent form; but under the instep and heel it is constructed with a thicker and arched sole, as if purposely to sacrifice the natural elasticity of this the principal part of the foot—that which displays its finest and most important mechanism. In this St. Crispin is obviously at variance with his Maker, sacrificing to ignorant and capricious fashion the natural functions of the human foot—the *sole* interests of humanity entrusted to his care! the consequences of which are, that those who wear such boots walk either with a jolting, rotating gait from heel to tread, like a wheel without its felloes, or else after the fashion of a peacock. For example, our labouring population, who wear rigid soles almost from heel to toe, are, from the circumstances of their case, necessitated to adopt the jolting, rotary, femoral action; hence the ironed soles which they wear; while those who drag a lighter harrow, and wear high heels with rigid waists and bent or flexible toes, adopt the tiptoe, rigid heel, knee-action theory, going down-hill, as it were, although walking up an inclination less than that represented by the dotted lines from the toe to the heel, because such make a greater angle with the ground, *thus converting the foot into a wedge.*

But the second figure, which we now give, of a distorted foot, proves that the above awkward modes of walking do not involve the worst view of the picture; for although the outside of the boot may have a passable appearance to the superficial observer, it is otherwise in too many instances within.

This diagram represents a foot which has been injured in youth. It is a fair likeness of many, giving an exact outline of the interior of the boot, the point of the great toe being brought from its natural position to that which the middle toe should occupy. An enlargement of the articulation of the great toe with the metatarsus has taken place, partly in consequence of this pressure on the point, and partly by the effect of the high heel and rigid sole giving to the foot the mechanical action of a wedge, driven forward into the toe of the boot by the weight of the body at every step. Those who have

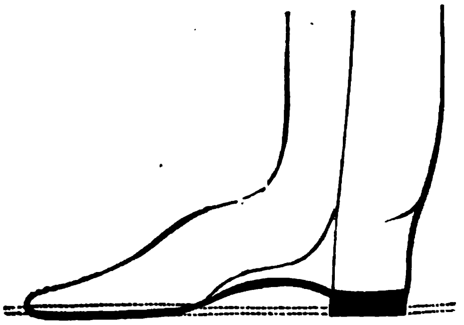


corny toes will be familiar with a very convincing proof of this, from what they feel in going down a steep inclination or hill: and unfortunately these enlargements continue to grow so long as the foot is thus wedged, becoming more and more tender as persons advance in years.

Viewing both these diagrams in connection with the first and second, showing the bones and bending of the foot, our readers will perceive that rigid soles, high heels, and bad leather are not at all adapted for the rising generation; and that, if the foot is injured at this period, it is no easy matter afterwards to obtain a comfortable boot, according to the present construction: hence the suffering and shifts which daily experience brings to notice. No doubt all feet are not distorted in the manner represented; but there are many modes of distortion besides this, which our limits will not permit us to individualize. But, generally speaking, if we set the labouring population of our rural districts, or even all who wear rigid soles, both rural and urban, to go up or down a very steep hill, the majority will be found unable to do so straight forwards, from the manner their feet and ankles are thus imprisoned in rigid leather; but by a sideway gait, or with the sides of their feet foremost instead of the toes, they will be found to struggle up or hop down in the most awkward motion imaginable; and were they to put off their laced boots or bluchers, and on their Sunday or light shoes, or attempt to go up or down barefooted, the result would be that they would sprain the ligaments and muscles of the instep and ankles, owing to their decayed and weakened state from inaction. (As a farmer's son, we speak from experience when wearing rigid-soled lacing boots in holding father's plough, during our apprenticeship.) How different is it with the youth of our Highland and Irish populations, whose feet and ankles almost attain to maturity before being injured by boots or shoes! We have often had occasion to admire the graceful and dignified walk of our bare-footed, half-clad Celtic peasantry, and tenfold more so the muscular action of their feet and legs in ascending or descending their native hills. Strangers to the cruel barbarities of St. Crispin and the caprice of empty fashion, their feet exhibit few of those distortions represented above, their case exemplifying the works of nature, but the other those of fallen humanity.

The above up-hill and down-hill experiment with rigid soles is deserving of the serious attention of a large class of our readers connected with and interested in the comfort and success of our brave troops now in the Crimea. With rigid boot-soles and injured feet, for instance, how can the common soldier keep the ranks in charging up hill or down hill? In ascending a steep hill, as at Alma, how far does he fall behind those who wore no shoes in youth? And if out of the ranks or behind, what are the consequences to himself and those who have the command?

Our next figure represents an elastic boot, the subject of our paper, already noticed. It has at the side a "gore" or "gusset" of elastic material, immediately above the waist, which is also elastic. This material is a compound, so manufactured as to bestow on the fabric the elasticity of caoutchouc, while it possesses the tenacity and durability of the best leather. The elastic action of the "waist" is such, giving, in the generality of cases, the articulations and ligaments of the tarsus free play, as to render the gore above it almost unnecessary—so much so, that few go to its expense. We ourselves do not at present use it; but at the same time with a long high instep, and much walking, we are not certain but it is worth its cost; as yet, however, we cannot speak from experience—the best guide.



The benefit of the elastic "waist" is experienced at the first trial. If the foot has been confined in high-heeled rigid-soled boots, the muscles of the instep and ankles may be so injured and weakened as to be easily exhausted, and even sprained when first called into action, if severe. This is what ploughmen, and all who wear thick shoes, experience when they walk any distance in thin ones. But exhausted and even decayed and injured muscles will soon acquire the natural tone and strength under cautious exercise. We draw special attention to this, for two reasons: *first*, because an injured foot requires means and time to cure it; and, *second*, to refute ignorant criticism and prejudice condemnatory of elastic boots from inattention to this very circumstance. In point of fact, the objection we have thus briefly answered is one of the strongest recommendations in favour of the elastic "waist" which can be given; in evidence of which, we may mention that it is now being extensively used by the most talented medical men in the capital, for the cure of lameness. The boots we are now wearing are strong clump or double-soled winter ones, such as are now worn by many of our nobility *for shooting boots*, and are easier to walk in than the thin shoes of summer. The easy manner with which this action adapts itself to the free motion of the instep, thus adding its length to the radius of the leg in walking, as seen in the second diagram, recommends them to the sportsman, farmer, and shepherd. Rigid soles, on the contrary, reduce this radius of the leg and instep some two or three inches in walking—a very serious mechanical loss, which, to ploughmen and millers, in carrying sacks up-stairs, is equivalent to increasing the height of the steps. And what is equally deserving of notice, while they thus reduce speed, they at the same time sacrifice muscular power, deranging in both cases the beautiful mechanism of the human foot. From losses of this kind our elastic boots have almost entirely relieved us.

A neater and closer fit of the elastic boot may be had than of any other, owing to the elasticity of the waist permitting of an elongation of the sole of the shoe equivalent, or nearly so, to that of the foot. This is an important desideratum to those who have tender feet—a class which includes aged persons generally, for they must always have their shoes so loose as to admit of shuffling; whereas the elastic material will allow of their being made less, while even of the same size they will not have an equal disposition to shuffle. For a similar reason the shoes of youth can be made sufficiently large to permit of the growth of the foot without giving rise to corns, bunions, and distortions, while they will save more than mothers a vast amount of labour with the darning needle.

These patent elastic boots have been "sealed" for the army, and we should neither be doing justice to our subject nor our readers at present, did we not draw special attention to their adaptation for the formal evolutions of military practice in the ranks, even in times of peace; while, on the present occasion, among the hills of the Crimea, what are the benefits which our brave soldiers would have received had they been well supplied with them? We here place before our readers the outline of a picture, which we rather leave to them to fill in the losses sustained on the one side, and benefits to be gained on the other, than attempt to do so ourselves. So much is now being said of the clothing and calamities of our army, that we rather drop the curtain on the past altogether, in the hopes of doing better for the future. An idle man may wear anything; but soldiers in active service require the best of materials, construction, and workmanship in their clothing from head to foot, and such will be found the cheapest for the country in the end, and therefore the united object of all should be to get this rule carried into execution.

Such is the brief account which we proposed of the wants of the human foot, the unfitness of high heels and rigid-soled boots for this purpose, and adaptation of the elastic waist. During the last century the celebrated Dr. Camper wrote an essay on "the best form of a shoe," involving elasticity in the sole by some means or other, but left the task of inventing the material with which to construct it to the Patentee. The invention has now been tested by ample and successful experience, sufficient to warrant its general recommendation. . It will be seen from an advertisement in another column that elastic bluchers are now being largely manufactured for Her Majesty's militia; and we hope more than the militia will benefit by this important improvement of boots and shoes, seeing it recommends itself so favourably to all our readers at this season of the year, when thick soles must be worn.

THE LIVE AND DEAD-MEAT COMMERCE OF OUR CHRISTMAS FAT-STOCK SHOWS.

(Concluded.)

As the grand object of our Christmas exhibitions is to grow the greatest quantity of the best quality of butcher-meat from a given quantity of food, so the object of a dead-meat show would be to turn that quantity and quality to the best advantage; in other words, to procure the farmer the highest price for it, leaving the butcher, at the same time, a gainer.

A proposition so promising as this obviously demands illustration, both on the part of the farmer and the butcher. Let us, therefore, take an example of each: viz., a farmer having ten fat bullocks to sell, and a butcher wanting as many to purchase, in weight and quality such as to come within comparison, and be subject to similar circumstances in marketing as our Christmas fat stock.

In this case, if the prize ox had been weighed before leaving home, and weighed again before being slaughtered, both times fasting, then the difference of weight would indicate the waste on the animal system, including both the carcase and offal, during marketing; and if a second ox of the same weight were slaughtered at home, and the four quarters and the offal weighed, it would give a close approximation to waste upon the two respectively of the first ox. By a series of examples of this kind, carefully performed, practical *data* would be acquired sufficient to enable the farmer and butcher, in our example, to determine between live and dead-meat sales, so as to divide the profits subsequently noticed.

The waste being different at different seasons of the year, both of the ox and carcase, the experiments at Christmas would consequently only be satisfactory for that season, so that they would also have to be continued throughout the year, to furnish results for the different seasons.

But, although this is true as to food, temperature, and drought during summer and winter, and state of blood during spring and autumn, the circumstances of each season being thus different from those of the other, yet quarterly experiments would soon become general were those of Christmas but once successfully instituted. Were a farmer, for example, to find out that he lost some 20s. to 30s. by loss of weight on his ox during the exhibition in the Bazaar, Baker-street, and upwards of this when sent to Smithfield, and only 5s. on the carcase when sent to Newgate, while one-fourth of the live weight is retained at home at Christmas for manure, he would naturally feel anxious to know the difference during spring, summer, and autumn, in order to regulate his sales at those periods. Even the manure itself would be a profit to him of inestimable value.

The farmer, however, would gain more than the manure and difference of weight; for he would also get a better price for the different parts of the carcase, because he would then be able to forward the fore-quarters to the manufacturing districts, where there is generally a better demand for them than in the capital; or dispose of them to the village butchers of the neighbourhood with the edible portion of the offal.

The loss sustained on this score at present is incredible—so much so, that nothing short of experiment would reach conviction; and this is just what we propose, by dead meat shows and the sale of Christmas fat stock by weight.

All sales in accordance with such a proposition would have to be effected by weight, as we have just stated. If a salesman, for instance, sold an ox, it would have to be at so much per stone, not "sinking offal." And it would be much better for illustration that the four-quarters were sold separately instead of the carcase at one price; and still more so, if the five different qualities into which it is divided were priced in this manner, and also the different items of the offal, as it would show what was really worth the carriage of sending to the capital or any similar distance, and what was not.

At first sight, sales of this kind would, no doubt, be subject to serious objection on the part of butchers; but this arises from the force of habit—the long, uninterrupted practice of selling by lump, as handed down from times prior to the use of weights and measures. Now, nothing can be more absurd or antiquated than this same practice of selling live butcher-meat by lump, or, in other words, by guessing the weight. What would be thought of other trades, were they to sell their goods in this manner? Why, then, should farmers be an exception in this respect, opposed to the progress of commercial science, reducing sales and purchases to speculation?

But the best refutation of this objection is, the profit which the improved practice would yield; for at present the farmer gives away about half the weight of his oxen for nothing, or the weight of five out of the ten; while for the other half the butcher is unable to give him its full value, because the quality of part does not suit his customers. In this position the farmer only receives value for little more than the third of the weight of the article he manufactures, paying railway carriage for the whole (No wonder, although Mr. Mechi complains *it will not pay!)*; while the butcher is cumbered with two-thirds of the weight he purchases, as useless to him, and subjected to other losses, as we by-and-by shall see; whereas, were separate qualities disposed of separately, they would fetch their respective values, that which is useless to the butcher being of infinite value to the farmer.

And in addition to all this, a great economy of labour, generally speaking, besides improvement in its quality, will be effected. No doubt, on the part of the farmer, it will not be very much; but to the butcher and all intermediate parties the advantages will be great. Between the feeding-box and the shambles, for instance, there is a vast amount of rude labour expended in the management of the fat ox, which would be avoided; and the more artificial the position he is in, as regards breeding and fattening, the greater will it be. Of late years it has, consequently, been very much on the increase from the improvement which has taken place in the quality of fat stock; and but for the accommodation of railroads, would have swallowed all the profits. In many cases, if not the majority, an active slaughterman could slaughter a couple of bullocks before the farmer's man or drover would drive them to the railway; so that the change of practice in this case would only substitute the one kind of labour for the other, as the railway engineer has superseded the drover in bringing fat stock to the capital—a very great improvement in the subdivision of labour; as one slaughterman could easily slaughter for a large district of country, ranking in society far above the drover or farmer's cattleman.

The butcher, more especially those who have a family trade, would have many inducements to comply with a dead-meat Christmas show and sales by weight, as the practice would have a tendency to increase the weight of the finer qualities of meat, elevate the professional character of his trade, reduce his expenses and capital necessary to carry on business successfully, and to secure a more uniform profit, doing away with speculation at the same time in purchasing.

Family butchers in the capital, for example, cannot dispose of inferior qualities (being often obliged to send the entire fore-quarters to the dead-meat market, to be sold at a loss), so that the heaviest ox is not always the best bargain to them. And they not only want a large weight of loin, rump, fore-rib, buttock, thick-flank, and middle-rib, but also these several parts well mixed, free from patchiness, and of the finest quality; otherwise a large amount of waste goes to the tallow-tub, fetching less than half price. Now, however good judges they may be in Smithfield, the increase of sales in Newgate of the above parts proves that their experience is in favour of our proposition; and consequently that, as a dead-meat show would enable farmers to improve the quality and weight of those parts, they would not only have a better supply, but experience less loss from the tallow-tub.

In the second place, the family butcher would only have to purchase those parts which his customers required; and hence would be relieved of all the dirty work in attending a live-stock market, driving home, feeding, slaughtering, and disposing of the offal, while the sanitary state of his shop and house would at the same time be greatly improved. These are important advantages, whatever view may be taken of them; whether in a sanitary sense, a professional, or moral. In the former, for instance, it would greatly tend to improve the health of both the butcher and his family, as also his men, to say nothing of the neighbourhood, which suffers both from his slaughter-house and congregation of rats, which its sewage never fails to collect about his premises. This latter is a horrible nuisance, for whenever the sewage of the slaughter-house reaches the main sewer, rats soon smell it, and thread their way up to its source to catch the washings in their most recent or fresh state, where they burrow and nestle; filling the neighbourhood with pestilential malaria from decomposing animal matter which they collect under the foundation of almost every house. In a professional or moral sense again his *status* in society would be greatly elevated, from being relieved of the above dirty work, and its many low associations. A glance at the routine of Smithfield and the slaughter-house, with the maltreatment to which fat stock are subject, renders further proof on either of these topics unnecessary.

The investment of capital in the slaughter-house, again, with the expenses of slaughtering, attending Smithfield, feeding and managing of stock, where the price of food and labour is high, greatly circumscribes the butcher's profit. His annual expenditure, including the interest of capital thus invested, not unfrequently exceeds his income, if it does not do so in the vast majority of cases: consequently, were he relieved of this expenditure, he could give the farmer a higher price, and yet retain a large balance in favour of himself. In other words, were the farmer, who has the ten fat bullocks, to enter into arrangements for supplying him with dead meat as he required it, instead of live, he could afford to divide the profits with him, and be a gainer. Now what is to hinder the farmer and butcher to enter into such an arrangement, through the instrumentality of a dead-meat salesman to receive and remit the money from the latter to the former, carcases going directly from the railway terminus to the butcher's shop, thus saving the tolls, charges, and inoculation from the pestilential atmosphere of Newgate and Leadenhall. and delivering them also at the same time in the best possible condition? Now the answer to this is, that the only obstacle which can stand in the way of such a practice is the force of antiquated habits on men who neither comprehend the instrumentality of the railway and electric telegraph to themselves, nor the commercial advantages which others are enjoying by their use. A very large saving, therefore, could have been effected by a more judicious subdivision of labour and management of fat stock immediately prior to slaughtering, amounting to upwards of half a million in the capital alone, which butchers and farmers could divide between them; and there can be no doubt that Christmas shows of dead meat, and the selling of our Christmas fat stock by weight, would greatly facilitate its realization.

The next and last advantage to the butcher which the contemplated improvements would effect, is a more regular profit, or interest of capital invested in the trade. From the perishable nature of butcher-meat, there is no other branch of commerce more necessitated to frequent renewals of stock, and to invest capital so often as he is, and who is, therefore, more dependent upon a small but regular profit. His customers' accounts may be collected monthly, quarterly, or yearly, but a week is too long between purchases: for 52 times, at least, he must invest his capital in Smithfield yearly; hence the speculation, as to weight and quality, transactions being as it were "buying a pig in a sack," and risk on live stock between the market and slaughtering. In the dead-meat market there is no such speculation or risk, for there the butcher only buys to supply immediate wants; and, as the principal ones attend it daily, they would be at no additional expense in marketing, while less capital would be required to carry on a ready-money trade, consequently leaving greater profits.

It will thus be seen that but for the offal-guano to the hungry lands of the farmer, and waste upon his fat stock during market-day, the butcher would reap the largest half of the advantages at issue, at present partly lost, and partly acquired by live-stock salesmen and jobbers. That all intermediate jobbing between the two should be excluded as much as possible, with due attention to the economy of labour and capital, no one will deny. We have mentioned a slaughterman and salesman, who may represent, the former the butcher, and the latter the farmer. Or the country butcher may purchase and slaughter in the slaughter-house of the farmer, either on commission or his own account, sending the different parts to different markets, according to demand. Apart from such encouragement as that which we propose, the carcase trade is fast superseding the live stock; and the fact need not be wondered at, considering the amount of the profits.

NEW GUANO DEPOSIT. — Several shipping houses in this city have for some time been engaged in procuring guano from Isle Aves, a small island situated in lat. 15, long. 60¼, about 400 miles from the coast of Venezuela, 200 miles south of St. Thomas, and 150 miles west of Guadaloupe. This island contains a large quantity of guano, and several cargoes of it have been recently brought to this port. A few weeks since, while the crews of our vessels were engaged in securing their cargoes, they were driven away by an armed ship belonging to the government of Venezuela, and the island taken possession of by a body of soldiers. Now, the question is, to whom does this island belong? There is an island called Aves just off the coast of Venezuela, which undoubtedly belongs to that government; but the Isle Aves we refer to was formerly under the Danish flag, and has been claimed by the French. At all events, it is pretty certain that Venezuela has no just claim to it. Here is a chance for Mr. Marcy; and as there probably is more guano on this little island than on the whole group of Gallipagos, it is certainly worth his attention. It would be well enough to settle the ownership, so that our shipmasters may know who to deal with.—New York Herald.

[illegible] APPLICATION.

[illegible] for years, on the value of the [illegible] which has been so long [illegible] our townsmen. It may be easy [illegible] Why don't you take it? But [illegible] of preaching up [illegible] show us a practical way of getting [illegible] words, how all this may be made [illegible] advantage, or, as Mr. Mechi [illegible] town sewage be profitably [illegible]

[illegible] we are afraid, is so far anything [illegible] dead that all were deposited [illegible] was but ground travelled [illegible] night. Mr. Mechi was [illegible] manure could do. We [illegible] and proportionately [illegible] as a nuisance. [illegible] not only as [illegible] of Sewers, but [illegible] sewage, testified [illegible] his own success [illegible] could only be [illegible] further, of [illegible] while Mr. [illegible] meeting back [illegible] How was the thing [illegible]

[illegible] generally ran away [illegible] discussion of the [illegible] Let us see. [illegible] to answer [illegible] town sewage [illegible] Mr. Mechi [illegible] -work, and [illegible] of a com- [illegible]

[illegible] Now [illegible] and other [illegible] country [illegible] sewage [illegible] oth landlord and tenant. With regard to the mode of con-eyance, it appears to me that our railway lines might be vailed of to lay down lines of pipes ; but, of course, all such uestions would be easily arranged by competent engineering thorities. Perhaps it will be as well to state that fifteen ards of three-inch iron pipe per acre will be all that is re-uired, or about 5¾ cwt. of iron per acre. This is the quantity n my farm. I apprehend no one will doubt the economy of ansmission of fluids by tubes, seeing that by road carriage e charge of carting near the metropolis would be at least 8d. r ton per mile."

Mr. Johnson gratifies us by announcing that ondon will wait no longer, but is at last really inking of doing something on its own responsibility:—

"Only last week the Metropolitan Commission of Sewers, which he (Mr. Johnson) was a member, resolved to make a mmencement by constructing a sewer which should take the ole of the sewage of the inhabitants of the metropolis south the Thames. That sewer was to commence in Lambeth, to oceed through Southwark, at a depth of thirty or forty feet, d after traversing Rotherhithe, Deptford, Greenwich, and 'oolwich, it was finally to empty itself as low down the river Plumstead Marshes. On arriving here it would be mped out of this great trunk sewer, which, at its exit, ould be twelve feet in diameter, by means of an engine, to a receiver, which would be large enough to contain the wage of the inhabitants of London south of the Thames for enty-four hours, and at the first ebb of the tide it would be ured into the river, so that it could not return to annoy the tizens. The Commissioners of the Metropolitan Sewers were present obliged to dispose of the sewage in that manner; t they hoped it would not long find its way into the river. must be got rid of in some way ; but they were convinced at no long period would have elapsed, after this arrangement d been carried out, before some means would be found of mping that great mass of liquid manure to an elevated position, and leaving it to be distributed by its own gravity over he thirsty gravels of the county of Kent."

Mr. Chadwick thinks—

"The difficulty which stood in the way was chiefly the question between landlord and tenant as to who should pay the cost. What he apprehended would be done was this—that at the outfall they would have an engine, and run the pipes along the highways and byeways. The hose or distributory apparatus could be worked for 800 or 1,000 yards, and manure right and left. To run the pipes along highways and byeways, however, legislative way-leave would be required; but when that was obtained, all the farmer who wanted a dose of manure for his land would have to do would be to give his order to the town. It would be a mere matter of bargain between the town and the farmer; but what he had always said to the towns was that at first they should give it to the farmer for nothing."

Let us briefly sum all this up. According to Mr. Mechi, "it remains with agriculture itself to determine whether this interesting question shall receive its proper solution." On the authority of Mr. Johnson we learn, "the sewage must be got rid of in some way;" and by Mr. Chadwick, "that the chief difficulty is a question between landlord and tenant." Now the solution of this question may remain with the agriculturist, but it certainly does not begin with him. The sewage must be got rid of somehow or other—the towns must get rid of it; and it remains to be seen whether they will place it within the reach of the farmer. The chief difficulty, as we take it, is not between landlord and tenant, but one that remains still with the towns alone to determine.

Professor Way, who was very deservedly complimented as "not only an excellent chemist, but as being thoroughly practical," has embodied in the Society's Journal the substance of his lectures delivered last spring on this subject. The paper, it will be observed, was frequently referred to at this meeting of the Farmers' Club, and we earnestly advise such of our readers as may not yet have seen it, at once to do so. They will gather from it much as to the real value of town sewage—not very highly estimated—and they will be pleased to find in how thoroughly a practical spirit the Professor enters on the difficulty of its application. How often has the farmer been libelled about not using this town sewage! How little really has he had, or has he still to do with it! Let a few plain words from Professor Way tell with whom the proper solution of the question yet remains:—

"It has always appeared to me that this question of sewage-water is regarded in a wrong light. A most exaggerated opinion of the prospects of manufacturing manure from it is entertained by local Boards of Health and town corporations. Not content with making arrangements by which the removal of the refuse and the cleansing of their watercourses is to be obtained, they in many cases stipulate for a rental for the right of taking the sewage matter. I do not doubt that if the *liquid sewage* could be properly distributed over the extent of surface which it is capable of fertilising, a revenue would be forthcoming towards the reduction of the town-rates. But, in the absence of arrangements for liquid distribution, and unless we should discover some process far better than any we possess for the solidification of the sewage, I am convinced that the results must be all the other way: that is to say, the towns must be content to *pay* towards the operation, instead of looking to it as a source of income."

There was a little too much of the old story on Monday. The farmer is quite willing to avail himself of town sewage when it can "be supplied at a cost sufficiently moderate to warrant its use!" The initiative is still with the towns and companies.

TOWN SEWAGE AND ITS APPLICATION.

There is no man stands abuse with so much equanimity as the English farmer. There is no one either enjoys more of it. We begin indeed to fear that he is getting case-hardened, and that he does'nt mind it, because he is used to it. Like the philosopher in livery, he merely says—"Swear away, sir, if you think it will do you any good, for I am sure it will do me no harm." If it is not, perhaps, come to swearing, we have certainly no lack of hard words to drive us on onwards. Why does'nt the farmer do this? or, why will he do that? or, why does he continue to neglect the golden opportunities offered him? Why will he suffer to run to waste all that which might be turned to so much account? Look at the liquid streams of wealth, for instance, which are so abundantly at his service. Here, as it is, they turn to nothing but nuisance and disease, when so much good might be extracted from them. He will know better in time, however, take more interest in a question which so immediately concerns him, seek what he now shuns—and so forth.

This has now been for some time one of the grandest, and as it would seem one of the safest of charges against him. Great are the virtues of liquid manure—well admitted, in fact, are its effects, saving only when we are called on to believe it as having done that which it never has done. Still there are but few who in a common-sense way will question of what advantage the application of manure in this form may be made susceptible. You grant that, says our censor in triumph, and then look at the sewage of towns! There it is, all running to worse than waste. Why don't you buy it up and apply it, every drop of it? But you don't know your own business—you don't take an interest in what you ought to—you don't unite with the towns—you are not a commercial man—and so on.

In answer to all this, let us say at least that, fortunately for him, the farmer *does* understand his own business; and, moreover, that he does take an interest in what concerns him. That he takes an interest in this very question was tolerably well proved at the discussion at the London Farmers' club, on Monday night. It is long since there has been a better attendance. Members came from all parts to hear Mr. Mechi tell them just what they wanted to hear—"How far can town sewage be profitably applied to the purposes of agriculture?" Here the matter came directly to a practical bearing. It may be all well enough to descant, as we had been doing for years, on the value of that liquid refuse which has been so long annoying and puzzling our townsmen. It may be easy enough to ask, Why don't *you* take it? But then what is the use of preaching up sour grapes? Show us a practical way of getting at them; in other words, how all this may be made available to advantage, or, as Mr. Mechi himself well puts it, how can town sewage be profitably applied?

The question, we are afraid, is so far anything but solved. A great deal that all were disposed more or less to admit, was but ground travelled over again on Monday night. Mr. Mechi was still eloquent on what liquid manure could do. Mr. Chadwick yet more diffuse, and proportionately less effective, on sewage simply as a nuisance. Mr. Cuthbert Johnson, who spoke not only as one of the Metropolitan Commissioners of Sewers, but as one who had practically applied sewage, testified, at the instance of Mr. Chadwick, to his own successes. Mr. Nesbit proved this sewage could only be used in a liquified form; Mr. Moore told, further, of the wonders it had accomplished; while Mr. Wood, as a practical man, brought the meeting back to the grand consideration—"How was the thing to be done?"

In simple fact, the speakers generally ran away from the great difficulty—the discussion of the subject as it was put on the card. Let us see. however, how far they did attempt to answer it, What is, or has to be done to bring town sewage within the use of the agriculturist? Mr. Mechi turns to the now common servant-of-all-work, and at once puts the matter in the hands of a company:—

> "The question will arise, Who is to undertake this? Now in railroad undertakings, we find landed proprietors and other interested parties joining with town capitalists, and affording them every inducement and opportunity to open up a country with general benefit. Let the same be done with sewage. Depend upon it without this co-operation no town capitalists will be so miscalculating as to place their capital at the mercy of local prejudice or neglect. It therefore remains with agriculture itself to determine whether this interesting question shall receive its proper solution. But supposing that the new company has laid down its main line of pipes for country distribution, where will you find the £3 per acre for the net-work of iron pipes, &c., requisite on every farm? It appears to me that where the capital is required it may be readily obtained from the Lands Improvement Company or Land Drainage Company, and that the annual charge which would liquidate principal and interest in a few years would leave a large margin of advantage for

both landlord and tenant. With regard to the mode of conveyance, it appears to me that our railway lines might be availed of to lay down lines of pipes; but, of course, all such questions would be easily arranged by competent engineering authorities. Perhaps it will be as well to state that fifteen yards of three-inch iron pipe per acre will be all that is required, or about 5⅓ cwt. of iron per acre. This is the quantity on my farm. I apprehend no one will doubt the economy of transmission of fluids by tubes, seeing that by road carriage the charge of carting near the metropolis would be at least 8d. per ton per mile."

Mr. Johnson gratifies us by announcing that London will wait no longer, but is at last really thinking of doing something on its own responsibility:—

"Only last week the Metropolitan Commission of Sewers, of which he (Mr. Johnson) was a member, resolved to make a commencement by constructing a sewer which should take the whole of the sewage of the inhabitants of the metropolis south of the Thames. That sewer was to commence in Lambeth, to proceed through Southwark, at a depth of thirty or forty feet, and after traversing Rotherhithe, Deptford, Greenwich, and Woolwich, it was finally to empty itself as low down the river as Plumstead Marshes. On arriving here it would be pumped out of this great trunk sewer, which, at its exit, would be twelve feet in diameter, by means of an engine, into a receiver, which would be large enough to contain the sewage of the inhabitants of London south of the Thames for twenty-four hours, and at the first ebb of the tide it would be poured into the river, so that it could not return to annoy the citizens. The Commissioners of the Metropolitan Sewers were at present obliged to dispose of the sewage in that manner; but they hoped it would not long find its way into the river. It must be got rid of in some way; but they were convinced that no long period would have elapsed, after this arrangement had been carried out, before some means would be found of pumping that great mass of liquid manure to an elevated position, and leaving it to be distributed by its own gravity over the thirsty gravels of the county of Kent."

Mr. Chadwick thinks—

"The difficulty which stood in the way was chiefly the question between landlord and tenant as to who should pay the cost. What he apprehended would be done was this—that at the outfall they would have an engine, and run the pipes along the highways and byeways. The hose or distributory apparatus could be worked for 800 or 1,000 yards, and manure right and left. To run the pipes along highways and byeways, however, legislative way-leave would be required; but when that was obtained, all the farmer who wanted a dose of manure for his land would have to do would be to give his order to the town. It would be a mere matter of bargain between the town and the farmer; but what he had always said to the towns was that at first they should give it to the farmer for nothing."

Let us briefly sum all this up. According to Mr. Mechi, "it remains with agriculture itself to determine whether this interesting question shall receive its proper solution." On the authority of Mr. Johnson we learn, "the sewage must be got rid of in some way;" and by Mr. Chadwick, "that the chief difficulty is a question between landlord and tenant." Now the solution of this question may remain with the agriculturist, but it certainly does not begin with him. The sewage must be got rid of somehow or other—the towns must get rid of it; and it remains to be seen whether they will place it within the reach of the farmer. The chief difficulty, as we take it, is not between landlord and tenant, but one that remains still with the towns alone to determine.

Professor Way, who was very deservedly complimented as "not only an excellent chemist, but as being thoroughly practical," has embodied in the Society's Journal the substance of his lectures delivered last spring on this subject. The paper, it will be observed, was frequently referred to at this meeting of the Farmers' Club, and we earnestly advise such of our readers as may not yet have seen it, at once to do so. They will gather from it much as to the real value of town sewage—not very highly estimated—and they will be pleased to find in how thoroughly a practical spirit the Professor enters on the difficulty of its application. How often has the farmer been libelled about not using this town sewage! How little really has he had, or has he still to do with it! Let a few plain words from Professor Way tell with whom the proper solution of the question yet remains:—

"It has always appeared to me that this question of sewage-water is regarded in a wrong light. A most exaggerated opinion of the prospects of manufacturing manure from it is entertained by local Boards of Health and town corporations. Not content with making arrangements by which the removal of the refuse and the cleansing of their watercourses is to be obtained, they in many cases stipulate for a rental for the right of taking the sewage matter. I do not doubt that if the *liquid sewage* could be properly distributed over the extent of surface which it is capable of fertilizing, a revenue would be forthcoming towards the reduction of the town-rates. But, in the absence of arrangements for liquid distribution, and unless we should discover some process far better than any we possess for the solidification of the sewage, I am convinced that the results must be all the other way: that is to say, the towns must be content to *pay* towards the operation, instead of looking to it as a source of income."

There was a little too much of the old story on Monday. The farmer is quite willing to avail himself of town sewage when it can "be supplied at a cost sufficiently moderate to warrant its use!" The initiative is still with the towns and companies.

LONDON, OR CENTRAL FARMERS' CLUB.

TO WHAT EXTENT CAN TOWN SEWAGE BE PROFITABLY APPLIED TO THE PURPOSES OF AGRICULTURE?

The first monthly meeting of the members for the present year took place on Monday evening, Feb. 5, at the Club House, Blackfriars, and was most numerously attended. The subject for discussion, which was introduced by Mr. J. J. Mechi, was stated in the following terms :—"To what extent can Town Sewage be profitably applied to the purposes of Agriculture?" Among those present were Mr. E. Chadwick, who has filled so important a part in relation to the sewage question, more especially in the metropolis; Mr. Baker, of Writtle; Mr. Grainger; Mr. Cuthbert Johnson; Mr. Mechi; Mr. T. E. Paulett; Mr. S. Skelton; Mr. N. G. Barthropp; Mr. Tyler, Essex; Mr. Bullock Webster; Mr. J. Wood, Sussex; Mr. Howard, Beds; Rev. C. Day; Mr. H. Hall; Mr. C. Hall; Mr. E. Purser; Mr. J. Smith, Rye; Mr. H. Cheffins; Mr. J. C. Nesbit; Mr. T. Owen; Mr. Cressingham; Mr. Oakley; Mr. Wood, Croydon; Mr. Bidwell, Ely; Mr. Poole; Mr. J. Bradshaw, Kent.

The chair was taken by Mr. B. P. Shearer, of Swanmore House, Hants, who, in opening the proceedings, took occasion to thank the members for the honour which they had done him in electing him as Chairman for the year. The chief favour which he had to ask of them was, he said, that they would support the Club, believing as he did that it was one of the most important associations in the kingdom. There was nothing now more important than the study of agriculture, and the Club had done much to develop it. He would conclude by at once introducing Mr. Mechi to their notice.

Mr. Mechi said : One hundred years hence, which is not long in the history of a country, our successors will scarcely believe that a nation wanting annually many millions of quarters of grain to fill up its own inadequate production of food, should waste the only means by which such deficiency might be made good—I mean the productions of the land when they have fulfilled their office of nutrition to man and beast. Every one now at all conversant with the theory of modern agricultural chemistry must know that our agricultural produce loses little by such a process, and that the bulk of its elements are returned to us in the shape of excretæ, if we take the trouble to collect them. I am aware that the practicability of doing so has been questioned ; but I purpose this evening to show that there is no difficulty in the matter, except what exists in the brain of man. The same power that brings your water into London will take it out again ; for, according to Prof. Way and other chemists, 2,500,000 inhabitants will only add 3,627 tons daily in solids and fluids to the quantity of water. If agriculturists studied attentively Professor Way's able paper on Town Sewage (see Royal Agricultural Society's Journal, vol. xv., part 1, page 135), it would teach them a great and profitable lesson. They would learn that of all the manure made by human beings (and I have no doubt by animals) 12 parts out of 13 in weight escape as urine, only 1-13th part being solid ! Well may farmers love the sheep-fold, and well may they deplore yard feeding, where the rains from the untroughed roofs may, in too many instances, thus take away nearly all their manure. Mr. Way, with his usual care and exactness, has found that, taking the average of men, women, and children, each individual of the population will in the course of twenty-four hours contribute to the sewage of a town one-quarter of a pound of solid and three pounds of liquid excrement. A knowledge of these facts shows us how trivial is the question of solid manure, for at a quarter of a pound each daily the total solid manure of 2,500,000 people in this metropolis will only weigh 279 tons. According to Mr. Way, the excrement of each person is diluted with or distributed through twenty gallons or 1,400 times its own weight of water. It must appear singular to a disinterested observer that whilst farmers seek eagerly after every new manure, and are subject to much imposition in such purchases, they appear to be apathetic on the question of town sewage. I think much of this neglect must arise from the fact of its being in a fluid state, for to the distance of 100 miles from London the solid manure of the metropolis is purchased by agriculturists at an expense of from 4s. 6d. to 6s. per ton, one-half of this cost being, of course, for freightage, and then another 30 to 50 per cent. must be added for cartage to the fields, with a further charge for turning over, spreading, ploughing in, &c. Omitting the sanitary consideration, there can be no class so deeply interested in the question of town sewage as the British farmer. Those sewers carry away to our rivers all the products which he has at so much care and cost produced for the food of the people. To repair the exhaustion caused by these supplies, he rushes to Peru for bird's dung, at an expense of some millions, whilst the very grave-yards of foreign nations are taxed to supply bones for his turnips. The rapid increase of water-closets and new sewers, with a more abundant water supply, are daily lessening the supply of human excretæ in a solid form, diminishing, in fact, *pro tanto*, the ordinary channel of supply, so that shortly we may expect that only the stable manure and ashes of London will be available for agricultural purposes, whilst the weekly supply of 6,000 or 7,000 bullocks, 40,000 sheep, and all the other vast solid and fluid consumables of the metropolis, from tea to turtle, will be floating down the sewers unheeded and unsolicited. This cruel neglect can only arise from a disbelief of the value of such manure, or from a doubt of the possibility of applying it economically. I purpose therefore this evening to go into statistical details with a view to ventilate the question, and to prove how easily such an operation may be successfully carried out with individual and general benefits. Water alone is manure: who can doubt this? Look to the costly water meadows in various parts of the kingdom, and what farmer who has a water meadow does not appreciate its great value to him, as producing early, late, and most abundant vegetation? My own experience with two miles of pipes on my farm of 170 acres has proved that fluid applications of manure are far the most profitable, and that their influence is quite as important and advantageous to cereal as to other crops. In proof of this I have thrashed some fields of wheat, producing 6 quarters per imperial acre; oats, 13 quarters; and barley, 8 quarters, which latter is 1 quarter more than I estimated in my balance sheet. Now such productions as these on a naturally wretched soil prove more than volumes of argument, and I have no hesitation in saying that had my neighbours to pay £2 per acre annually in interest for improvements over and above their present rent to obtain similar results, they would be considerable gainers. If it answer my purpose to lay down pipes, erect an engine, make tanks, erect pumps, and so on, for the mere purpose of applying the manure made on my farm in a fluid state with a large supply of water from my spring, surely it must equally and more certainly pay a farmer to receive back his corn, bullocks, sheep, and other productions, after they are done with, at a very much smaller cost; for their very essence will return to him accompanied by all the good things that metropolitan luxury can command from every foreign part. If we go into a statistical inquiry of the weekly supply of London in tea, coffee, and sugar; wine, spirits, and beer; fish, flesh, and fowl (foreign and British); the tons of soap, and the thousand-and-one refuses of our manufacturers, gas-works, &c., one becomes amazed at the fructifying power involved in such a consideration. The alkaline and granited solutions of our London pavement by trituration and abrasion, the smuts from our smoke, have all a considerable value. The mere wear-and-tear of shoe-leather has its value, as it grinds down the pavement into hollows. I apprehend that the daily cost of feeding each individual in this metropolis, taking the average of rich and poor, and young and old, would not be less than tenpence per day, or thirty-seven and a-half millions sterling per annum. Now in parts of Lincolnshire it is the custom to value the manure at half the cost of the oilcake consumed. On this principle, which appears to be a sound one, the agricultural value of the manure from this thirty-seven and a-half millions of food ought to be something very considerable, to say nothing of the food consumed by the animals of the metropolis. The rubbing, washing, and agitating which the solid excrement receives, in passing through miles of tortuous sewers, cause it to be dissolved, and pass away in a fluid state, which we may any day prove by an examination of the sewers' mouths at low water. I think farmers cannot be aware that all the solid and liquid manure of men and animals is liquefiable by solution or suspension, and can be applied in a shower, sinking deeply into the subsoil of drained land. Perhaps I may be here permitted to explain why I consider this mode of application far superior to the solid form. If you make a transverse cut or opening in the soil, you will find that the British agricultural pie-crust is only five to eight inches thick. The slips and railway cuttings plainly reveal this humiliating fact. Below this thin crust we see a primitive soil, bearing most unmistakeable evidence of antiquity and unalterability. The dark shades of the cultivated and manured surface have not been communicated to the pale subsoil; and we have evident proof that solid manure ploughed in, in the ordinary way, exercises little influence on the subsoil. Nor can this be wondered at, when the plough sole has been polishing and solidifying the floor at the same depth for the last few centuries. Now, when I apply liquefied manure (which means all the solid and liquid excrements of the farm animals, mixed with water), it soaks deeply into the subsoil to the depth of the drains, which I have seen, on the very strongest clays, discharging the liquefied manure at a depth of four and five feet. Here, then, is the secret of my great crops on a miserable soil. The manure vitalises, warms, and chemically changes the miserable subsoil; the roots of the growing crops know this, and send down their fibres or mouths to appropriate and elaborate the subterranean treasures now for the first time placed at their disposal in an available condition. I could show you twenty loads of rich oilcake bullock-pudding or manure; I would mix it with water, apply it in a shower, and you should search the surface in vain for any proof of its whereabout. It has gone down to do its work. I will not drag you through all the details of the *modus operandi* of this method of manuring; you may see it all any day you choose on my farm, or on any of those of others who are practising the same process. What I want you to believe, is that town sewage is liquid guano, applicable to every soil and every crop, and worthy of your utmost attention. It is true that undrained land, requiring drainage, such as heavy clays and spring soil, must undergo that operation before they can derive the benefit of such an application; but there are extensive tracts of chalk, sands, and hot gravels, almost praying to be fertilised by the sewage of our towns. Although I apply my liquefied manure on the surface, I am quite convinced that during the summer season, and amongst the growing crops, it would be far more advantageous to apply it subterraneously, as effected by Mr. Wilkins last year at Wokingham, and this year at Reading. By this means the openness and tillage of the surface are undisturbed; the rays of heat and light are employed in warming the earth, and in evaporating from the leaves the subterranean supply of fluids which the plants absorb by their roots, and which arise to them by capillarity. The question is a large one, involving considerations of cost; but most certainly production is vastly increased and stimulated by the new method. One important reason for the superiority of liquefied over solid manures, is, that water is the great arrester and conveyance of ammonia, that invisible and truant spirit which is ever escaping unseen from reeking dung-heaps. It is this ammonia which dissolves the silica of the soil, and makes the kernel of our wheat, and the lean of our flesh; and it is for this ammonia that we so affectionately prize unwashed Peruvian guano, or bird's-dung. When you have learned to apply fluid manure to the soil, you will find your crops yield as much as they do after the sheepfold; and you will get corn as well as straw, that is if you do not sow too much seed. You must give up all hopes of obtaining town sewage in a solid form, for Professor Way's able paper (which every agriculturist should read) in the Royal Agricultural Society's Journal, and other evidences, are conclusive on that point. I understand upon good authority that the Commissioners of Sewers have decided that a main tunnel on the south side of the Thames shall receive the sewage of 1,200,000 people, convey it to Plumstead marshes, whence it will be pumped into a reservoir, and at high tide pass away with the flood water of the Thames—that is, if British agriculture is insane enough to permit such a cruel waste. The question will arise, Who is to undertake this? Now, in railroad undertakings, we find landed proprietors and other interested parties joining with town capitalists, and affording them every inducement and opportunity to open up a country with general benefit. Let the same be done with sewage. Depend upon it without this co-operation no town capitalists will be so miscalculating as to place their capital at the mercy of local prejudice or neglect. It therefore remains with agriculture itself to determine whether this interesting question shall receive its proper solution. But supposing that the new company has laid down its main line of pipes for country distribution, where will you find the £3 per acre for the net-work of iron-pipes, &c., requisite on every farm. It appears to me that where the capital is required it may be readily obtained from the Lands Improvement Company or Land Drainage Company, and that the annual charge which would liquidate principal and interest in a few years would leave a large margin of advantage for both landlord and tenant. To those who desire to see the mode of applying town sewage may be quoted the instance of G. H. Walker, Esq., who takes the town of Rugby, &c.; — Worsley, Esq., of Rusholme Park, near Manchester, who uses the sewage of a neighbouring district. In both these cases, steam-power is applied, although I think Mr. Walker's pipes of 3-inch diameter are hardly large enough for the diameter of his pumps. Of course if the London sewage is used, I apprehend it would be pumped to elevated district reservoirs, whence it would flow from main pipes connected with smaller ones on the various farms, so that they would be always charged with a sufficient pressure to cause a jet; this would render unnecessary any steam engine or tank on the farm. A register of quantity like a gas meter would enable the company to make their periodical charge. I annex the following statistical account with which I have been favoured by Edwin Chadwick, Esq., C.B., our greatest authority in such matters:—

> "The gross daily quantity of water pumped into the metropolis was, in the year 1850, 44 million gallons. It may have been increased somewhat since that time, but I should expect that it would still be within 50 million gallons per diem. I proved at that time that about three-fifths of the quantity pumped in was wasted on account of the intermittent methods of distribution. The actual quantity consumed for domestic purposes, or that you could estimate for sewage as containing house refuse, or house manure in suspension or solution at times when there is no rain applicable as manure, would not be more than 20 million gallons per diem. I say house manure because rain and storm waters bring as surface washings dung from the streets, and soot and birds' dung from the roof of houses. You may judge of the daily quantity visibly by the fact, that 45 million gallons would be delivered in 24 hours by a brook 9 feet wide and 3 feet deep, running at the rate of 3 feet per second, or a little more than two miles per hour; and three sewers of three feet diameter, and of a proper fall, will suffice for the removal (for distribution) of the same volume of refuse or soil water. The total weight of this annual supply of water is nearly 72 millions of tons. The daily cost of raising the whole supply by engine-power 100 feet high (for distribution) would be about £25, or £9,000 per annum. Supposing the supply were equally distributed *i. e.*, the 44 millions, it would be about 50 pails-full for each house, and would weigh about 13 cwt."

Those who doubt the cheapness at which water can be raised may be assured by visiting the Croydon Waterworks, where 650,000 gallons are forced to a mile distant, and elevated 150 feet, at a cost of 13½ cwt. of dust coal per diem of 24 hours. With regard to the mode of conveyance, it appears to me that our railway lines might be availed of to lay down lines of pipes; but, of course, all such questions would be easily arranged by competent engineering authorities. Perhaps it will be as well to state that 15 yards of three-inch iron pipe per acre will be all that is required, or about 5½ cwt. of iron per acre. This is the quantity on my farm. I have 170 acres piped. Amongst numerous papers that I have written on this subject, I beg to refer to one under the head "Sewage," in "Blackie's Cyclopædia of Agriculture." The value of London sewage has been variously estimated; but Professor Way, in his usual careful way, has calculated it by its ammonia at two millions sterling per annum. He has made no valuation of the water alone. I apprehend that 50 millions of gallons daily, or 224,000 tons, would have, even when unmixed with manure, a considerable irrigating value. In order to ascertain whether this application of sewage will pay the farmer a profit, and leave a sufficient interest for the capital invested by a company, let us calculate 72 million tons of sewage at one penny per ton, would be £300,000. Now, take the pumping or raising this quantity at the exaggerated sum of £50,000 annually, there would remain £250,000 as interest on capital invested, which, at six per cent., would be also the exaggerated sum of £4,000,000 sterling. I have assumed the sum of one penny per ton as representing that which would leave the farmer and landlord a very large profit on their pipe investment. I can confirm this by my own practical experience. But it must be obvious to any one who reasons that, as 100 tons of water per acre represent a rain-fall of 24 hours, this alone, without the saturation of manure, must be worth one penny per ton, or 8s. 4d. per acre, and indeed, in dry weather, for grass crops, very much more. As to the quantity required per acre, Mr. Telfer, of Cumming Park, Ayr, tells me that he applies 500 tons of water per Scotch acre, at five dressings, to his Italian rye-grass, with 5 cwt. of guano at each dressing, making a total annual application of 25 cwt. of guano per Scotch acre (one-fourth larger than the English acre). This is in a naturally moist climate; therefore, we may estimate the water-absorbing power of the barren sandy wastes in the neighbourhood of the metropolis far more considerable. That those wastes would be rendered highly productive after the application of town sewage cannot be doubted. The experiments of Mr. Wilkins, who grew two crops of hemp and flax in one season at Wokingham, last year, settle the question. Now, if you apply 500 tons per acre you will only require 152,000 acres to absorb your 76 millions of tons. As 640 acres are a square mile, you would at that rate require 237 square miles, or a square area whose diameter would be about 15 miles. I have a strong conviction that a very much larger quantity of sewage, say 1,000 tons per acre, at least may be profitably applied to our sandy, gravelly, and chalky wastes. This would afford a great economy in distance and expense. On the Edinburgh meadows as much as 6,000 tons per Scotch acre are applied; but that appears to me hardly a necessary quantity. Still, if such large quantities could be applied to so limited an area, it is clear that instead of one penny per ton the cost need not much exceed one farthing. Six thousand tons at one farthing per ton would be £6 5s. per acre. This would pay; for the average letting of the Edinburgh meadows to the cow-keepers was, I am informed, last year £21 per acre—a pretty good evidence of the beneficial effects of town sewage on waste lands that were a few years since worthless and barren. I apprehend no one will doubt the economy of transmission of fluids by tubes, seeing that by road carriage the charge of carting near the metropolis would be at least 8d. per ton per mile. There is no fear of our being overwhelmed with cheap hay or superabundant milk by this process; for our metropolitan wants become annually more and more gigantic; but I do know, from extended and minute observation, that the infants and juveniles of this metropolis would present a very different muscular and general development if this scheme were carried out, for now the wretched wrecks of noble short-horned cows, observable on every green patch around the metropolis, speak volumes of the thin sky-blue which is vainly expected by fond parents to form the bone and flesh of their dear children. Their pallid faces and feeble limbs present infallible evidence of defective nutrition. In conclusion, I do hope that this club of practical agriculturists will, by their resolution this evening, stamp their opinion of the necessity for this great national economy.

Mr. C. W. JOHNSON was anxious to say a few words on this important and opportune subject. He used the word "opportune" advisedly, certain bills being about to come before the legislature in connection with this subject, which materially affected the interests of the farmers of England. The great difficulty hitherto had been that even when farmers were fully convinced of the value of sewage, they had not been able to avail themselves of it. Enormous masses of liquid manure had been constantly pouring into the rivers, or wasting in cesspools all over the kingdom, because it was out of the reach of the English farmer. It should be borne in mind, too, that the sewage of a town generally increased in value in proportion to the distance to which it was removed (Hear, hear). In the immediate neighbourhood of London attempts had been made to pump the sewage up. But what was the result? Why, that it had been conveyed to districts where the farmer could obtain the richest stable manure, and concentrated manure of all descriptions, for the mere cost of carting it away (Hear, hear). Under such circumstances it was not surprising that the thing had proved a failure. A new light, however, had now dawned on the British public, chiefly, he must say, through the great and almost gigantic efforts of his friend Mr. Chadwick. That gentleman had made it understood that sewage, instead of being poured into an adjoining river, should be conveyed to a distance; and the result was that the metropolis was now about to set a noble example in that respect. Only last week the Metropolitan Commission of Sewers, of which he (Mr. Johnson) was a member, resolved to make a commencement by constructing a sewer which should take the whole of the sewage of the inhabitants of the metropolis south of the Thames. That sewer was to commence in Lambeth, to proceed through Southwark, at a depth of thirty or forty feet, and after traversing Rotherhithe, Deptford, Greenwich, and Woolwich, it was finally to empty itself as low down the river as Plumstead Marshes. On arriving here it would be pumped out of this great trunk sewer, which, at its exit, would be twelve feet in diameter, by means of an engine, into a receiver, which would be large enough to contain the sewage of the inhabitants of London south of the Thames for twenty-four hours, and at the first ebb of the tide it would be poured into the river, so that it could not return to annoy the citizens. The Commissioners of the Metropolitan Sewers were at present obliged to dispose of the sewage in that manner; but they hoped it would not long find its way into the river. It must be got rid of in some way; but they were convinced that no long period would have elapsed, after this arrangement had been carried out, before some means would be found of pumping that great mass of liquid manure to an elevated position, and leaving it to be distributed by its own gravity over the thirsty gravels of the county of Kent. A similar arrangement was to be made for the north of London, with its population of about two millions. In that case the sewage was to be pumped into a receiver at Barking Creek; and thus on both sides of the river huge volumes of liquid manure would be available for the purposes of agriculture. Considering of what this sewage consisted, it was impossible to suppose that it would be allowed permanently to find its way into the river. The amount of sewage conveyed by the sewer on the south side of London would be equal to at least 9,000,000 imperial gallons per hour. What did each of these gallons of sewage contain that the farmer could render available? Professor Way, who, besides being an excellent chemist, was thoroughly practical, and always looked to the pounds, shillings, and pence, stated, in the *Journal* of the Royal Agricultural Society, vol. xv., page 153, that in an imperial gallon of London sewage, amongst other substances not so useful to the farmer, he found the following :—Organic matter and salts of ammonia, 301·82 grains; phosphoric acid, 10·44 grains; lime, 24·53 grains; potash, from the detritus of the London streets, 48·13 grains—total of all substances, 492·26 grains. With regard to the washings of the London streets referred to by Mr. Mechi, he was once inclined to think, in common with many others, that they could not be of much value; but it appeared from the examinations of Prof. Way—examinations made for the use of the General Board of Health—that even these contained substances most valuable for the purposes of the farmer (Hear, hear). The Professor's examinations had two divisions, one having reference to streets which were macadamised, the other to streets paved with granite; and, what they would not perhaps be prepared to expect, the latter were found to contain the most valuable substances. In a gallon of street-water from a granite-paved street of great traffic, Professor Way found 82·75 grains of potash; in the same quantity of water from a similarly paved street of little traffic he found 8·75 grains of potash. In a gallon of water from a macadamised street of great traffic the quantity of potash was 18·77 grains; in the same quantity of water from a similar street of small traffic 5·27 grains. Improved arrangements with regard to sewage were not confined to London, but were being extended to the other towns of the kingdom; and the people were beginning to feel that to sleep over cesspools, or to allow their contents to flow into the adjoining wells—the water in which had perhaps been drunk several times before—was not very rational, and could not be otherwise than prejudicial to the public health. He was convinced that the sewage of the large towns of this country would soon be generally managed on more scientific principles than it had been, and when the sewage was collected into reservoirs, unless he had over-rated the skill, intelligence, and enterprise of the farmers of England, they would not be slow to avail themselves of the boon thus offered to agriculture.

Mr. CHADWICK would be glad if Mr. Johnson would state the result of the application of the sewage of his own house to some land adjacent.

Mr. JOHNSON said his experiments had now been going on for four years. He had been desirous of ascertaining the effect of the application of the sewage of a house, containing five inhabitants—which, it would be remembered, was the average population of all the houses in England—to a given area of land. In order to arrive at a correct conclusion, he had the soil analyzed before the experiments commenced, and he had had it analyzed since. The result which was quite satisfactory, would shortly be published in detail: it was shortly this, that while the cultivators of grass land on the opposite side of the hedge had been very well contented with a cutting and a half in the year, he had got five separate cuttings. (Hear, hear.)

Mr. CASTLETINE, a member of the Croydon Board of Health, observed, in reference to the obstructions to such experiments, that three actions had been commenced by mills at Croydon against the Croydon Sewage Company.

Mr. WOOD (Sussex) said that, if the sewage could be carried at the rate spoken of by Mr. Mechi, it must certainly answer the purpose of capitalists to provide the drains and pipes, and do the pumping; and if it could by these means be conveyed to their doors, he was satisfied the farmers would not be so blind to their own interests as to decline to buy it. To provide the machinery was a matter that did not rest with the farmer: it was rather the work of capitalists in the towns; and if the club arrived at a conclusion which would give something like a correct idea of the expense at which the thing might be done, and show that it would be profitable to the farmer to incur that expense, the discussion of the question would have proved practical and beneficial; and he had no doubt that, in the course of a few years, such arrangements would be made as to absorb for agricultural purposes the whole of the liquid manure of the large towns (Hear).

Mr. B. WEBSTER said that at Malvern, which stood upon a hill, and was well supplied with water, the sewage was collected for the purpose of irrigation, and its use was undoubtedly attended with great pecuniary results, doubling, and in some cases even trebling the value of the lands to which it was applied. Mr. Littledale, in the neighbourhood of Liverpool, had been carrying out this system of irrigation, and as far as mere profit was concerned nothing could answer better; but very great objection was taken by the inhabitants residing in the vicinity on account of the dreadful smell which resulted from the practice in the summer, and which constituted a serious nuisance. (Hear, hear). He believed that if the sewage of London could be taken to such poor sandy soils as Bagshot Heath, which now produced nothing, they might soon be converted into the finest market-gardens in the world; but its application to clay soils was not very likely to be attended with much benefit (Hear, hear).

Mr. EDWIN CHADWICK said, some years had elapsed since last he had the honour of addressing the club upon this subject, and at that time few or no experiments had been made. He had little to communicate that was new, and he should not have ventured to address the club to-night, did he not think it necessary to answer the objection to the use of liquid manure put forward by the last speaker, namely, that it was the occasion of a nuisance (Hear). To the method of distribution to which that gentleman had referred, and which had been the method in use for fifty years at Edinburgh and other places, there were certainly strong objections on that ground. It did indeed create a sewer-lake, the evaporation from which was undoubtedly very objectionable. But this was the case not only with sewer water; for if they examined the operations of water-meadows, they would find that they were, in truth, but extended marshes, where the rot was prevalent in sheep, and the typhus in men. This was observed more especially in Italy; hence it was a part of the Italian law that water-meadows should not be formed within six miles of a city (Hear, hear). He had not only this objection in a sanitary point of view, but on investigating the subject he had also agricultural objections to the practice. At the water-meadows of Edinburgh they had used in the course of years not less than sixty inches of sewerage. The great point he had got friends to establish was this, that by another method of distribution, *i. e.*, by the jet, and given out in such proportions as the plant required at different times, a much less amount of liquid manure would attain the object much more effectually (Hear, hear); and he ventured to say that it had been proved, in respect to the Edinburgh water-meadows, that, on account of the great value of the land—namely, £20 an acre—the rent of the space occupied in carriers would pay for putting down iron pipes and distributing the manure by that method (Hear). To the water-meadow system of distribution he objected, therefore, on the important agricultural ground—the ground of cost. There were some places, as in Devonshire for instance, with good undulating surfaces, where these meadows could be made at a cheap rate; but in other cases they could not be made at less than from £10 to £16 an acre. Now, by every method yet tried of pipe distribution by steam power, the cost of laying down pipes would be from £4 to £5, which might be commuted into about 6s. a-year rental for the pipes; and the cost of the application, including the interest of capital, and all put together, would, he thought, be about 10s. or 12s. per acre per annum; whilst the cost of forming and keeping meadows alone would be seldom less than from £1 16s. to £2 per acre per annum. With respect to the question of nuisance, Mr. Webster had spoken of Mr. Littledale's distribution of manure in that point of view. How Mr. Littledale distributed he (Mr. Chadwick) could not tell. It might be that the tank in which it was received, or some carrier, was the nuisance.

Mr. WEBSTER: No; they are all through pipes as you propose.

Mr. CHADWICK admitted there was a nuisance at the moment of distribution. At Manchester he had had distributed three loads of old night-soil in about seven of water, and in a state most offensive; but within twenty minutes after the distribution, any person going over the land would have been unable to detect that such an operation had been performed (Hear). In the neighbourhood of the parks, where they had been top-dressed with road-scrapings, children were known to have been sick for weeks afterwards, and he had himself seen cases in which serious mischief had followed the process of top-dressing the parks with road-scrapings and dung. The way to suppress that nuisance was first to put the whole of the manure into water, and then apply it by the method of jet distribution. And if the application was made at eight o'clock in the morning, by nine the park would be free from the nuisance (Hear, hear). Mr. Mechi's tank was a locality that he should not like to visit with his stomach in a susceptible state (a laugh); and he had often told Mr. Mechi that he applied his manure in too great a degree of strength, and that he would greatly improve his culture if he were to dilute it more, and apply it more frequently (Hear); nevertheless, if they went there, and witnessed the distribution, they would find that in ten minutes the nuisance ceased to exist. Instead, therefore, of the extension of this practice being the extension of a nuisance, he was confident it was one which, if adopted in the parks of the metropolis, would put a stop to a nuisance, and greatly relieve the persons residing in the neighbourhood. Experience on that head was very complete and satisfactory; and he deduced it from the case of Rugby, where the system had just begun to be introduced under the following circumstances:—It happened that the outfall of the sewer there came immediately before the mansion of Mr. Walker; and that gentleman, apprehending serious results, was induced to read what had been published upon the subject of sewerage, and to visit the farm of Mr. Mechi, and other places, for the purpose of seeing how this mode of distribution affected the nuisance. Mr. Walker was so perfectly satisfied on that head, and also as to the productive power of the manure, that he at once made an offer to the town of Rugby for the whole of its sewage. He (Mr. Chadwick) had recently seen Mr. Walker, and inquired of him particularly with respect to the nuisance; and the answer he received was that it was entirely at an end (Hear). Another instance in which the system had been carried out was under precisely similar circumstances, at Mr. Worsley's, Rusholme Park, Manchester. Mr. Worsley occupied some land near an outfall that discharged itself into a brook forming the ornamental water before his mansion. He had in his occupation about seventy acres of park land, and for the purpose of avoiding a nuisance in applying the manure to the land, he was advised to distribute it in the liquefied form. Mr. Mechi and he (Mr. Chadwick) were present at the distribution, and they could both bear testimony to the fact that there was an end of the nuisance. Let it be remembered, too, that this putting an end to the nuisance was putting an end to the waste (Hear, hear). When manure was spread in a solid form, what was the operation which took place? It first became disintegrated by decomposition; and in that process, as every chemist knew, the most valuable portion of the manure escaped, and all they got was some portion of the residue washed into the soil by occasional rains. By the other method, they put it in solution at once, and thus avoided all the loss which was caused by decomposition. Any farmer might satisfy himself upon this point, without committing his whole farm to it. Let him take a load of stable-dung, put it in solution in water, and apply it with a water-pipe on a limited portion of land; he would then easily see the result. He would be able either to fertilise an area five-fold that which he could do with a single load spread in a solid form, or fertilise the same area to a five-fold degree (Hear). A friend of his, in America, who did this for horticultural purposes, astonished the whole of the exhibitors at the shows by the magnitude and weight of his produce. They saw him drawing from a hogshead something that they regarded as a great elixir, and the people were nearly ready to tear him to pieces in order to get his secret out of him. The secret was this: taking off the top of the hogshead he put into it a load of stable-dung, and ordered his gardener to pour fresh water upon it until the smell was entirely gone. Here, then, was the whole of his secret. With these simple appliances he had achieved such magnificent results (Hear, hear). Doubts had, however, been expressed upon the subject. One authority said it would do for green crops, but he doubted if it would answer for cereals. It had been a maxim with him (Mr. Chadwick), for some years past, that the fact of a thing being done was cogent evidence of its possibility (Hear, hear). Let the gentleman, then, who entertained these doubts look at the results—the crops of every kind—which had been produced (Hear, hear). In Scotland, where the thing had been carefully done, they had succeeded in raising from a Scotch acre, which was about an acre and a quarter English, as much as ninety tons of cabbages (applause). Mr. Mechi would corroborate him when he said that, as a general rule, with the cereals—with the wheats—they had found no instance where one-fourth more per acre had not been produced by this method of applying manure than by the highest culture in top-dressing, or other means. He thought he was correct in stating that.

Mr. Mechi: Quite so.

Mr. Chadwick.—With respect to other crops, he had seen the views put forward by Mr. W. Hoskins upon the subject, to the effect that it was best to apply the manures in a pulverised form. But, as powder, there was not one particle of it that could feed the plant (Hear, hear). A powerful microscope was necessary to discover the mouths of the plant—the spongia. Nothing, therefore, that could be seen by the naked eye could enter the plant. Mr. Pusey, also, had expressed doubts respecting the use of liquid manure. But in his last paper in the Transactions of the Royal Agricultural Society, he had given a very interesting account of the difference in effect between the water drill and the other drill. To his surprise, Mr. Pusey found that he had double the crops he had ever had before. With these examples, and those of some 30 of 40 farms that were now at work with it, and of numerous towns that were going to work with it, he (Mr. Chadwick) thought the club was in a better position to pronounce an opinion than when they last had the question before them (Hear, hear). The difficulty which stood in the way was chiefly the question between landlord and tenant as to who should pay the cost. As he had already observed, he objected to water-meadows on sanitary grounds, and also on agricultural grounds as wasteful both of capital and manure. What he apprehended would be done was this—that at the outfall they would have an engine, and run the pipes along the highways and byeways. The hose or distributory apparatus could be worked for 800 or 1,000 yards, and manure right and left. To run the pipes along highways and byeways, however, legislative way-leave would be required; but when that was obtained, all the farmer who wanted a dose of manure for his land would have to do would be to give his order to the town. It would be a mere matter of bargain between the town and the farmer; but what he had always said to the towns was that at first they should give it to the farmer for nothing. He believed that more was to be realized by this method of distribution than by the water-meadow, though they all knew what great advantages had accrued from that system. There was a great deal of scattered experience which had not yet been brought to bear upon the question. In laying down new sewage for a town, out would come a farmer, for example, and exclaim "Hallo! you musn't divert that sewer," and upon inquiry it would turn out that for years that farmer had been quietly using the contents of the sewer to an extent which was only to be measured by the claim he set up for compensation; and he could assure the club that there had been claims to compensation by marchionesses and others, on account of such diversions of sewers, to an enormous amount (Hear, hear). He was perfectly satisfied that when the farmers got these sewers in their neighbourhood, they would be convinced that the mode of application he recommended was by far the most efficacious of any that had yet been adopted. With respect to their own manures, he should say that, generally, throughout the country (except with such advanced farmers as collected it in tanks) there was still a total waste of liquid manure (Hear, hear). Certainly the pipes ought to be laid down at the expense of the landlords; but the best mode of doing it was through the instrumentality of some of the companies. He did not refer to any company in particular; for the principle upon which they all acted was, he believed, a sound and good one (Hear, hear).

Mr. Moore said that in the year 1826 he read a report upon the water-meadows of Edinburgh, which contained statements of results so startling in their nature, that he went down there for the purpose of personally inspecting them himself, and found that some of the meadows were, in fact, letting for as much as £20, and some of them even £50 an acre. As a practical farmer, he could scarcely imagine how it was possible that land could be made to realize so large a rental, but inquiries on the spot compelled him to admit the accuracy of the statements contained in the report. These meadows were cut no less than six times a year with as heavy a swathe as a man could cut with a scythe, which was then brought in to feed the milch cows in Edinburgh. Since then he had seen most of the irrigation in the kingdom, and perhaps one of the most astonishing in its results was that at Mansfield. There the neighbouring meadows were irrigated by a stream which ran through the town, and which was not half the strength of the liquid manure of Edinburgh. These meadows, after having been let at 4s. 6d. an acre, and farmed at a great expense, were levelled by the Duke of Portland; and when he (Mr. Moore) inspected them, they were actually making a return of £11 an acre. That, he conceived, was a greater proof of the advantage of irrigating with highly diluted manure than the example of Edinburgh itself. He observed that it was stated by Mr. Chadwick, in 1846, that the meadows at Edinburgh were injurious to the public health; but he (Mr. Moore) learned that the water contained so much solid matter in mechanical suspension, that before it was put in the meadows, large tanks received it for the purpose of allowing that matter to precipitate; and these tanks, or cesspools, were certainly a nuisance: for, as their contents became decomposed, they threw out gases which were decidedly detrimental to health. The precipitate in the tanks had been offered to the farmers in the neighbourhood, but they refused to take it even for the expense of carting away; and he supposed it remained there still. It was not the solid matter contained in the liquid, in a state of mechanical suspension, that was most valuable for the nourishment of the plant, but that which was in a state of chemical solution. He granted that solid manure put on the surface of the land was not entirely lost, because the first shower of rain that fell washed the soluble matter into the soil; but it was only when rain did fall, that any benefit was derived from that description of manuring. One of the most interesting peculiarities in the application of liquid manure was this, that they would feed the crop as they fed the animal. In fact, they supplied the crop with meat and drink, and at a distance of twenty miles from London they could, as Mr. Mechi remarked, obtain it at a less expense than they incurred in carting soluble matter and spreading it on the land. He knew this to be a fact—it was capable of proof. It had been objected that this system was not adapted to clay lands. He admitted the force of that objection, so far as undrained land was concerned; but where clay land was drained and subsoiled, no application of manure would prove so productive as that of liquid manure.

Mr. Sidney thought the discussion could have been kept more closely to the subject as it stood on the card; and, for his part, he would like to see some experiments carried on, on a scale proportionate with the importance of the question, for he was tired of hearing the results that had been obtained from the sixth of an acre or from a wine-glass.

Mr. Nesbit said he had ascertained by experiment that the average deposit per annum of manure by the human species was 11 cwt. of urine, and 1¼ cwt. of solid excrement; and, whatever might be the value of these when diluted with water, he found their previous value to be from 12s. to 15s. per person per annum. That was about as much as could be safely predicated. He had seen many attempts made to obtain liquid excretæ in a more convenient form; but in every case the amount of water mixed with them prevented them from being reduced to a solid form; and he had come to the conclusion that it was impossible in any way to separate the solid and ammoniacal substances from liquid sewage, so as to make them available in a solid state. There was no known process by which they could separate its manuring principles from sewage water. They could obtain the solid matter with ease; but when they knew that there were phosphates of potash and soda, and ammonia and nitrates, which they did not and could not separate by the ordinary means, they must perceive that those ordinary means of separation would not apply. Whether or not new modes of separation would be discovered was, of course, an open question; but up to that time there had been no experiments proving that the thing was practicable. He had therefore arrived at the conclusion, that the distribution of this valuable manure —and the manure of London was, he would observe, worth from £1,500,000 to £2,000,000 per annum—could be accomplished in no other mode than by pumping it out and using it for irrigation at a distance. The smell which arose was, certainly, a little difficulty in the way. He had experienced an unpleasant smell from its use; but the odour generally arose from the circumstance of its having been kept too long. If means were devised by which the manure could be pumped out and distributed within eight-and-forty hours, this difficulty would disappear; and it would depend on the extent of country to be irrigated by this means whether the thing could be done or not.

Mr. Chadwick said that, when they smelt anything in the streets from a sewer, they might rely upon it that it was a sewer of deposit, and that the manure had been there five or six days; and in the new method of using pipes, everything issued from the outfall in a form in which it was never seen previously. The delivery was at the rate of four or five miles an hour in some towns, and in none was it less than a mile and a-half. By the new method, all manures would be delivered out before, under ordinary circumstances, it would have time to commence decomposition, about four days elapsing before it began to enter into that state.

Mr. Nesbit said, with regard to the use of sewage water upon cereals, if they gave a dressing or two of sewage water to a wheat crop, and afterwards had a long-continued wet season, the probability was that the whole crop would be laid. He did not see how this was to be got over, except by the exercise of intelligence. If they had a dry summer, everything that they did in this way would be attended with the greatest advantage; but if they had a very wet season after using sewage water, the crop would be thrown down. To this difficulty they would always be exposed by using dissolved manure of any kind whatever. In London, and other places similarly situated, mechanical means must be adopted, in order that the sewage might be carried where it was wanted.

Mr. Acton thought, as the Club had invited professional men connected with the science of agriculture to become members, it would have been better to have allotted one general question for discussion; still, by whatever means the quantity and quality of agricultural produce could be increased—whether by solid manure, manufactured manure in open sheds or in boxes, or in a liquid state by means of pipes, hose, and engine, for dispersing it over the surface of the land, as recommended by Mr. Mechi—he should be glad of it; and he would draw Mr. Nesbit's attention to the fact that the newly-sown grass in Kennington Park, formerly Kennington Common, which had been filled up with town-sewage and drainage and sweepings, had turned yellow; and he should like to have his opinion on this subject. However, the country would thank the Club for having brought this important subject before the public when prices were so high, and likely to continue so, and when there would be a difficulty in getting our usual supplies from Russia and Prussia, and perhaps from other exporting countries.

The **Chairman** observed that he did not think the nuisance arising from the use of liquid manure could be greater than that which was occasioned by spreading farm-yard dung on the land. Nothing could be more disagreeable for a time than the latter, but the smell of sewerage water went off with the greatest rapidity. People were now-a-day getting very fastidious respecting this question. For instance, he (Mr. Shearer) made a dung-heap, and was threatened by the magistrates. He put out the manure, and a lady fainted. He set fire to the couch, and, the smoke happening to turn the wrong way, all his neighbours declared they were driven out of their houses. The fact was, that the nuisance was a purely imaginative one, if the system of application were carried out according to the dictates of common sense. One difficulty which presented itself to his mind was, the low situation of most of our towns, which in general were built on the banks of streams; and as it was impossible to raise them, their sewage could be conveyed to the surrounding hills only by means of powerful steam-engines. Whatever might be the method adopted for raising this water, he was convinced that it would pay a company well to undertake the operation. It was to great companies, then, that they must look to carry it out; and once accomplished, he was satisfied that farmers and agriculturists would be ready to take whatever quantity could be supplied them at a moderate price.

Mr. **Mechi**, having remarked that his own experience proved that town sewage was useful and profitable on clay (where drained) as well as on sandy and light soils, moved the following resolution:—

> "That this club considers that the application of sewage manure might be rendered of great advantage to agriculture, if it could be supplied at a cost sufficiently moderate to warrant its use."

Mr. **Oakley** seconded the motion, which was agreed to.

A vote of thanks to Mr. Mechi for his paper, and to Mr. Shearer, the chairman, terminated the proceedings.

GROWTH OF WHEAT.

Sir,—Observing in your Notices to Correspondents you have (in the last number of the *Economist*) replied to W. H. B.'s inquiry with commendable caution, in assuming the wheat grown in Great Britain at only 17,000,000 instead of 20,000,000 quarters, as some estimates would make it; and, presuming the inquiry of W. H. B. is the echo of that which is now propounded with no little anxiety throughout the land, notwithstanding my high estimate of your authority in all matters of figures, I think he may be misled upon this much-controverted subject for the following reasons:—The produce of 20,000,000 quarters would involve the necessity, even at the high estimate of 32 bushels per acre as the average crop of the last season, that there should have been an area of 5,000,000 acres under wheat; and 17,000,000 quarters, your own opinion of the yield, at the same rate per acre, must have been raised from 4,250,000 acres.

Now let us see whether it is probable so large an area of wheat-land *could* have been under crop. That of Ireland for the year has been ascertained, and may be taken in round figures at 400,000 acres; that of Scotland we shall shortly know; but I will, for the present purpose, assume it to have been 250,000 acres—(in both these cases *I* have added about 10 per cent. to the average areas which have, I *think*, prevailed throughout the previous five or six years)—we then have left for England and Wales to provide, under wheat, in order to reach your estimate, no less than 3,650,000 acres; total, 4,300,000 acres.

This acreage for England and Wales amounts to nearly one-third of the entire tillage land—a proportion much in excess of that which will be found in the most highly-favoured wheat-growing districts. I must, therefore, take leave to differ materially from your figures of 17,000,000 qrs., being inclined to think the following will be a much nearer approach to accuracy—viz.:

Acres.		Qrs.
2,800,000..	Average area for five or six years previous to and ending with the harvest of 1853, yielding an average annual produce of..........	10,500,000
280,000..	Increase of 10 per cent. on the area of wheat in 1854, yielding a produce of......................	1,120,000
	Excess of produce above the average in 1854 on 2,800,000 acres of....	700 000
3,080,000		12,320,000

Whatever may, therefore, be the quantity of wheat annually required for the consumption of the country, which I estimate below the usual calculations made for it, the deficiency to be made good this year by foreign breadstuffs, compared with those which have constituted the average imports brought into home consumption in the previous five or six years, would be about 2,000,000 qrs. fewer than those averages; but from the facts that the stocks of old corn in the farmers' hands, and of foreign corn in the merchants', were all but exhausted at the commencement of the last harvest, and were precariously low, as well as from the extraordinary period at which, from the favourable season, the home-grower's produce of last year was unusually broken in upon—such a season as we can hardly expect to have repeated this year—it is evident that additional imports will be necessary, to place ourselves in such a position as will free us from the great risk of scarcity to which we were exposed last August and September, and from which we were so providentially delivered by one of the driest harvests ever experienced in England.

I am, sir, yours very obediently,

Jno. M. Buckland.

Gloucester, Jan. 26, 1855.

TWELVE GOOD QUALITIES IN A FARM.

Good farm and well-stored, good housing and dry,
Good corn and good dairy, good market and nigh:
Good shepherd, good tillman, good Jack and good Gill,
Make husband and huswife their coffers to fill.

READING FARMERS' CLUB.

The annual dinner of this Club took place on Saturday, the 27th Jan., at the George Hotel, Richard Benyon, Esq., Chairman.

After the usual loyal toasts, the Chairman said, in proposing "Success to the Reading Farmers' Club," there could be no doubt that clubs of this description were calculated to be of very material benefit in an agricultural neighbourhood, and that they may be made, if properly conducted and attended to, the means of disseminating a vast amount of information among those engaged in cultivating the soil. Associated with this club was a reading-room, well stored with a goodly array of books by eminent agricultural authors, as well as the most popular works of the day. But then he might be told that farmers were essentially men of practice, and not of books. Now, if he was to understand by that, that the farmer was so bigotted to his own opinions, that he would not admit the value of anybody's but his own—if it be stated that he would not follow any practice but what he had proved himself—he (the Chairman) would deny the argument, and thought the simple fact was contradicted by the extraordinary number of lectures to be seen in agricultural publications during the last ten or fifteen years. If there was a vast increase in the supply, then there must have been a corresponding demand; if there was that demand, it must have arisen from an increased wish on the part of agriculturists to become readers of books, and from a willingness to instruct themselves. Then he might be told that the farmer had not time for reading; that he was out at work all day, and when he got home he was willing rather to get to bed than to sit up and read a book. But was that so? Did they not find mechanics' institutions rising up—did they not hear of reading libraries for the poor (he was acquainted with more than one which were not only self-supporting, but actually laying by money for the increase of their libraries)—and were they to be told that the mechanic and labourer were more willing to learn than the farmer—that the servant had a better opinion of the value of instruction than the master? (Hear.) He was quite sure that this club might be made the means of distributing a vast amount of information on agricultural matters. It might be a matter of question whether the discussions would not make the club degenerate into a debating society on political subjects; but if the club was conducted properly, and maintained a proper position, it must conduce very much to the benefit of the neighbourhood. He therefore proposed that they drink "Success to the Reading Farmers' Club." (Applause.)

Mr. W. W. Champion said, it was an established axiom in agriculture, that the foundation of good farming consisted in growing good roots; therefore, if the Reading Farmers' Club had done no other good except that of having been the means of producing that fine display of roots in the Cattle Show yard last November, it would be a great thing. (Hear.) He begged to propose the health of the "Successful Competitors," with which he wished to couple the name of Mr. W. J. Hewett.

Mr. W. J. Hewett briefly replied, saying, that he sowed 60 acres of turnips, swedes, and mangel wurzel, and that all the land, with the exception of 10 acres, was manured. Strange, however, to say that the 10 acres of turnips which were not manured received the prize. This he did not attribute to any merit of his own, but to a variety of causes.

The toast was also acknowledged by Mr. Martin H. Sutton, on behalf of R. James Webb, Esq., to whom very distinguished prizes had been awarded, and who regretted his inability to attend this meeting. Mr. Sutton stated that he was also deputed to present to the Club, from Mr. R. James Webb, an elegant silver cup, value 10 guineas, for competition next season. (This cup was placed on the table, and much admired.)

Mr. Pigott, M.P., proposed the health of the "Subscribers to the special fund for root crops," and coupled with it the name of Mr. G. Shackel.

Mr. G. Shackel replied to the toast; and

Mr. Martin H. Sutton next acknowledged the compliment, and expressed the great interest he had taken in turnip and other root crops, with a view to the introduction of improved varieties. Being in the habit of attending the exhibitions of the Royal Agricultural Society and the Smithfield Club, in addition to other opportunities of observing the root crops in various parts of the kingdom, he could say advisedly, that he believed the cultivation practised by the members of the Reading Farmers' Club was at least equal to any he had witnessed elsewhere.

The health of the "Honorary Secretaries" was proposed, and received with applause.

Mr. Young returned thanks.

Mr. Martin Sutton, in acknowledging the toast, took the opportunity of mentioning that this society, in a town like Reading, situated in the midst of a large agricultural district, merited the support of the tradesmen of Reading—it being well known that most of them derived their trade from the owners and occupiers of land, and their labourers. Hitherto the society had been able to present a balance sheet with the balance on the right side, though small; but the increased advantages the club would afford when they entered upon the new club room over the entrance to the Corn Exchange, might also be accompanied with increased expenses, and the annual subscription of 5s. for membership might not be found sufficient, unless there were a considerable accession of new members. For this reason he took the liberty also of urging the vice-presidents to recommend the club to the support of their friends. This was not a political, but eminently a practical society, and he had the opportunity of knowing that from the reports of their proceedings published in the local papers, improved modes of cultivation and management had been adopted in other localities.

Competitors' Statement of Cultivation of Root Crops competing for Premiums.

Class 1.—For the best general Crop of Roots on farms of not less than 100 acres of arable, and not less than 20 acres in roots. Six competitors.

Mr. Isaac Deacon, Englefield, certifies that the extent of his general root crop is 77 acres, sub-divided thus: cabbage and mangold wurzel, 20 acres; swedes, 34 acres; turnips, 17 acres; and rape, 6 acres.

Richard Benyon, Esq., Bradfield, certifies extent of farm 350 acres; extent of general root crop, 71 acres, of which 38 acres were sown after tares, once ploughed.

The Rev. Thomas Stevens, Bradfield, certifies the extent of farm to be 160 acres of arable, and 100 acres of pasture; extent of general root crop, 65 acres, sub-divided thus: 16 acres swedes, 8 acres mangold, 41 acres turnips, and about 13 acres stubble turnips.

R. J. Webb, Esq., Calcot-place, certifies the extent of farms to be 500 acres; extent of general root crop, 87 acres, sub-divided thus: 45 acres of swedes, three acres mangold, three acres carrots, 22 acres turnips, and 14 acres stubble turnips. Awarded the premium of £7.

CLASS 2.—For the best piece of Swedish Turnips, not less than five acres. Six competitors.

Mr. Isaac Deacon certifies the preceding crops were—1852, grass; 1853, wheat. The land once ploughed, once dragged, twice harrowed, once ridged, and once rolled in February and March. Ten cart loads per acre of farm-yard dung, applied in March; one pint Liverpool swedes per acre, drilled with one-coulter drill in rows two feet apart, from May 30th to June 7th: and the crop was twice horse-hoed in June and July, and twice hand-hoed from July 8th to 24th.

Richard Benyon, Esq., certifies his preceding crops were—1852, mangold wurtzel; 1853, wheat. The land was ploughed twice, ten inches deep, and ridge ploughed in October; once harrowed before ridging. Dung applied in October, 14 yards per acre, and 2½ cwt. of superphosphate at time of sowing; 4 lbs. of Liverpool swede seed sown on ridges May 20th; horse-hoed three times, and hand-hoed twice. Premium of £2 for the second best five acres.

Mr. W. J. Hewett certifies the preceding crops were—1852, wheat; 1853, oats. Land fallowed in December, cross ploughed in April, and again in May, and ploughed for seed the first week in June, and 12 one-horse cart loads of farm-yard manure applied; one quart of Liverpool swedes per acre drilled 4th June; once horse and twice hand-hoed, first time the third week in June, and the last the third week in July; and he states the land was in a very foul state after the previous crop.

Mr. T. W. Hicks certifies his preceding crops were—1852, clover; 1853, wheat. Land four times ploughed, dragged, harrowed, ridged, &c. Eight cart loads of yard manure applied directly before drilling one quart of Liverpool swede seed per acre, on the ridge, the second week in June; twice horse and three times hand-hoed.

Mr. John Simmons certifies his preceding crop, 1853, to be wheat. Land ploughed four times; 25 bushels of wood ashes drilled with one quart of Liverpool swede seed per acre, May 20th; twice hand-hoed.

The Rev. Thos. Stevens certifies the preceding crops were—1852, swedes; 1853, wheat. Land ploughed once in November, once in May, and again, for seed, in June; three times dragged and harrowed, and once rolled. Applied 22 one-horse cart loads of yard manure, 35 bushels of manured ashes, and 1 cwt. of superphosphate drilled with seed, and 1 cwt. of Potter's guano sown broadcast, per acre; four pounds of Liverpool swede seed drilled on the flat, 26 inches apart from row to row, on June 6th, 10th, and 12th, 1854; once horse and twice hand-hoed in June and July.

R. J. Webb, Esq., certifies his preceding crops were—1852, clover; 1853, wheat. Land three times ploughed. Twenty-six cart loads of manure per acre, applied early in June; two pounds of Skirving's improved Liverpool swedes sown per acre; two horse and two hand-hoeings given. Premium of £4 for the best five acres.

Mr. R. C. M. Young certifies that his preceding crops were—1852, red clover; 1853, wheat. Soil, a wet tender loam on heavy clay, cultivated in five bout lands. Wheat stubble ploughed in January; two bouts of lands turned back, and ploughed across, dragged, harrowed, and scarified, clod crushed and couched in March; stirred across second time in April, and the same cultivation repeated; rough landed, manured second time, and seed furrow given in May. Applied 18 two-horse loads of farm-yard dung of ordinary quality, half on wheat stubble before fallowing, and half before the seed furrow in May. Three pounds of Suttons' "Ashcroft swede," drilled with Suffolk drill, May 17th, in rows two feet apart, on five bout lands. Hand-hoed in June, singled in July, horse-hoed in June and July, and hand-hoed after harvest—in the month of September, chiefly.

CLASS 3.—For the best piece of Mangel Wurzel, not less than two acres. Eight competitors.

Mr. Isaac Deacon certifies that his preceding crops were—1852, grass; 1853, wheat. Cultivation the same as above given for swedes. Ten loads of farm-yard dung applied from April 11th; orange and red globe mangel seed dibbled 2½ lbs. per acre, 14 inches by 24 apart, at a cost of 1s. 6d. per acre, the last week in April; two hand and two horse-hoeings in May, June, and July.

Richard Benyon, Esq., certifies his preceding crops were—1852, clover; 1853, wheat. Land ploughed once in autumn, deep; once in spring harrowed and ridged. Fifteen yards of box manure, one cwt. guano, four cwt. of salt, twelve bushels of soot, applied at time of sowing; four lbs. of yellow globle seed dibbled 7 inches apart, every other one pulled up 21st and 22nd April; three horse and three hand-hoeings. He states the crops would have been better with more dung. Awarded the first premium of £4.

Mr. W. J. Hewett certifies the previous crops were—1852, wheat; 1853, oats. Land ploughed three times, first in December, and last on May 1st; 12 one-horse cart loads of manure per acre. Three pounds of mixed yellow and red globe mangel, drilled the second week in May, and two horse and two hand-hoeings given.

Mr. T. W. Hicks certifies his preceding crops were—1852, clover; 1853, wheat. Cultivation and manure the same as given above for swedes. Two pounds of yellow globe seed, dibbled the first week in May; twice horse and three times hand-hoed.

Mr. Robert Lovegrove certifies his preceding crops, 1853, to have been peas; land ploughed once after stubble turnips in the month of March; 12 loads of cart dung per acre during the same month; 8 lbs. of seed per acre, drilled in the Suffolk drill, the first week in May; hand-hoed three times in May, June, and July.

J. Bligh Monck, Esq., certifies the preceding crops were—1851, beans; and 1853, wheat; land ploughed once in autumn, and three times in spring, and cleaned from couch. Twenty tons per acre of farm-yard dung, spread between the ridges, and covered by plough, drilled with a single row drill and roller attached; two horse and two hand-hoeings given.

R. J. Webb, Esq., certifies that his preceding crops were in 1852, clover; 1853, wheat; land received three ploughings; 26 cart loads of manure per acre late in April; 4 lbs. of yellow globe mangel, hand dibbled late in April; two horse and two hand-hoeings—first hoeing the third week in May, and in the middle of June.

Mr. R. C. M. Young certifies that his preceding crops were, in 1852, red clover; 1853, wheat; ploughings and other cultivation; quantity and quality of manure precisely the same as described above for swedes, except that the manure and the seed furrow were partly given in April. Six and a half pounds of lemon-shaped yellow mangel seed, of own growth, drilled in rows two feet apart, with Suffolk drill, on the third day of May. Hand-hoed in June, singled in July, and hand-hoed again between plants in July and August, before harvest; horse-hoed twice, in June and July. The mangel wurzel and swedish turnips on this farm, being grown in the same field, side by side, on similar soil, and under precisely the same cultivation, affords a fair comparative trial of the respective value of the two crops, in the unusually dry season of 1854. Awarded the premium of £2 as the second best in this class.

CLASS 4.—For the best piece of Turnips (not Swedish), not less than five acres. Three competitors.

Richard Benyon, Esq., certifies that his preceding crops were, in 1852, mangel wurzel; 1853, wheat. The same management in every respect as described above for swedish turnips.

Mr. W. J. Hewett certifies that the preceding crops were, in 1852, wheat; 1853, oats. Land received four ploughings; the first in December, and the last in June; manure applied, being ashes and malt dust; seed, one quart of green globe, drilled the 24th July; one horse and one hand-hoeing in August. Awarded the premium of £3.

The Rev. Thomas Stevens' certificate for this class has been mislaid since the judges' award.—Reading Mercury.

THE AGRICULTURAL GEOLOGY OF ENGLAND AND WALES.

BY JOHN DONALDSON.

(Concluded from page 111.)

GRAVEL

Is reckoned a diluvial deposit, and is formed of very small pebble stones, which vary in size from that of a small pea to that of cockles, and larger. They are often intermixed with sand, clay, loam, flint, pebbles, iron-ochre, and other mineral bodies.

It is an essential character of gravel, that it shall contain rounded stones *extraneous* to the place where they are fonnd; otherwise the decomposition of loosened rocks and strata near the surface will be confounded with it, as has often happened in the description of countries. The earthy matters found in gravel vary in all degrees from clay to sand, and according to the prevailing quantity of these matters, the gravel gets its distinctive name. Thus, sea-shore gravel, where the action of the waves hinders any mixture being retained, the term of "clean gravel" is applied; where there is a considerable portion of clay, we use the name "clayey gravel;" where sand is found, it is called "sandy gravel;" where loam exists, the name of "loamy gravel" is used, and so on. Some writers add the term "alluvial" to the above terms of sand, loam, and clay; using it in the strict and proper sense, as denoting matters worn, moved, dispersed, mixed, and deposited in water, in distinction from the regular or undisturbed matters of the terrestrial strata, which, though they show evident marks of having been deposited in a fluid, the perfect homogenity of the lamina of the strata, and their vast extension without rude or accidental mixtures, show that the laws which govern the two kinds of terrestrial deposit were not less distinct and marked than are the processes of the precipitation of matters before mechanically mixed and suspended in a fluid, and the crystallization of substances from menstrua supersaturated therewith. During the deposition of the strata, all was tranquil and quiet, except the movements of animated beings, which occupied successively the vast subaqueous plains of strata: during the formation and deposition of the gravels of every description, all was violence and confusion, and apparently so continued for a long period of time.

It is an important problem in geology to settle the point whether gravel is anywhere found "under regular and undisturbed strata." Many writers have asserted this to be the case; but Mr. William Smith and others, after a very long and most laborious investigation, have come to the conclusion that no such case can be pointed out in England. It is very true that indurated masses occur with some few rounded stony fragments in mixture, which are of difficult discrimination from the form of stratification; but these doubtful masses have been continued in character "downward" to such gravel beds, and nowhere are any regular strata ever found upon these doubtful masses, where due caution is used in making and extending the observations. Siliceous or grit-stone beds and rocks have been mistakenly classed with gravels, being composed of distinct grains of silex, or crystallized quartz in various sizes, and mixed and indurated together. But an attentive examination of their beds and accompanying strata, and of the newly cut or broken faces, and a comparison of them with the heterogeneous mixtures and irregular stratification of the real gravel rocks, as they appear in beds of immense thickness in many midland tracts of England, will easily distinguish the coarsest of the gritstone strata from the superficial mixtures above-mentioned, and from alluvial or water-worn mixtures of any kind. A uniform and constant law has regulated the formation of silex, and of coarse as well as fine gritstone, and sufficiently prevents their being confounded with the waterworn gravels. Accumulations of gravel are to be distinguished into native and foreign, according as the pebbles and earth, and extraneous bodies among them, can be referred to known and adjacent strata, or consists of stones and earths not elsewhere found, but in very distant countries. Except on the sea shore, where the gravel is formed by the waves acting on the fallen cliffs in fragments, the gravel of no spot corresponds with the strata on which it is lodged; and where it does very rarely occur, it will be found that the strata extend to the east or south-east of the place where the gravel is lodged; and this is explainable upon the principle that the general moving of native alluvia has happened from the south-east to the north-west quarter. The coarse and irregular gritstone strata occur beneath the carboniferous deposits, or the coal measures, but do not seem to indicate, as Mr. Kirwan thought, the near approach to the fundamental rock of granite. It is of very great importance to discriminate accurately the alluvia found in different parts of every country, and to trace their connection with the regular and continued masses on which they rest, and from whence they have been torn.

Gravel is reckoned diluvial deposit of the erratic block group, and therefore older than the alluvial formation. The title "diluvial" implies some very curious and important characteristics. Thick deposits of clay, sand, and pebbles are found on the very summit of hills as abundantly as in the valleys. Fragments of rocks, wholly different from those in the vicinity, lie in valleys, on hills, and even on islands, as in Staffa. These fragments are found solitary, or buried in clay, sand, and gravel in enormous abundance, and unlike to any rocks within one hundred miles of them. The largest blocks or boulders lie at the top of the deposition, resting on the sand and smaller gravel; successive depositions can rarely be traced, the mass being very indiscriminate; large and small bodies, light and heavy, being laid together, without any order or arrangement. Amidst such confused masses, bones of land quadrupeds, mostly or entirely of extinct species, and even of extinct genera, occur in abundance.

In order to account for these characteristic phenomena, it has been found necessary to suppose great changes of physical geography, or physical processes not seen in daily operation—such as extensive displacement, and change of level of land and sea; unexampled floods of water; surprising alterations of climate, or movements of glaciers in situations where they could not now exist. And one general and overwhelming inundation has been mentioned as being able to overcome the lesser inequalities of the surface level, but modified in its course by the larger ranges of mountains and valleys.

Many of the geological structures of diluvial deposits are attributed to the effects of glaciers, which are supposed to have covered the globe during a period of intense cold, and to have retreated to higher latitudes from some change of temperature, and thus appears to account for the great mammifers that are found in the Polar ice, and in the so-called diluvial formations. Erratic blocks, boulders, and gravels, have been attributed to the operations of glaciers in valleys, and subsequently of water; and it has been supposed that the former began, and that the latter finished the formation, as the parent rock of boulders, pebbles, and gravels is generally found at the head of each valley, and consequently could not have been washed in by currents, as the distribution of the materials diverges from the great central chains of the country that follow the courses of the valleys. It is supposed that the polished and striated surface of rocks and blocks proceeds from the effect of glaciers, and from the contact of moving masses of ice, and that the formation of gravels and of mud deposits, and of stratified fossiliferous accumulations, have derived the materials from masses of ice, and have been re-arranged by water produced by the melting of the glaciers.

The boulders and polished blocks found in clays and in stratified gravels may be supposed to have been produced by similar causes, as is constantly shown in the detritus found in the bottoms of Alpine valleys. The terraces or table lands forming equal altitudes on opposite declivities are supposed to be accumulations of blocks and pebbles on the flanks and terminations of the glaciers which occupied and formed the valleys, and were successively deposited by the melting of the ice. Though differently deposited, and presenting a double talus of ridge, one to the glacier, and another to the wall of rock flanking the valley, the common origin is evident with the accumulation of pebbles and of blocks polished and rounded under great masses of ice, and afterwards re-arranged by water. The marked differences of the arrangement of the materials in the deposits, is supposed to arise from the different action to which they have been exposed; large and small fragments falling on the glaciers, were deposited promiscuously, while in valleys the finer part is generally on the top, from having undergone the action of ice and water. Uniform polish of rocks *in situ* is produced by ice, and the striated form by the intervention of substances which produce *striæ* agreeing with the direction of the moving mass, while the effects of water are sinuous erosions on the softer materials of rocks. The finer materials being found at the greatest distance from mountains, is thought to support the theory of the glaciers retreating from the valleys, as the blocks and detritus are larger as we approach elevated regions, and also that the triturating action of sheets of ice has formed the vast groups of unstratified gravels and pebbles. But a great difficulty occurs in forming the connexion between stratified fossiliferous deposits and the glacier detritus, and in accounting for the remains of arctic animals being found in the clays superimposed on the till, and therefore posterior to the glacier epoch. This theory of glaciers accounts for the disappearance of the organic beings of the diluvial period, and also for the disappearance of the great mammifers enclosed in the polar ice; it is associated with the elevation of alpine countries, and the dispersion of erratic blocks, and it is also intimately mixed up with the subject of a general diminution of terrestrial heat. But much attentive observation, and a profound acquaintance with facts, will be required to establish any such theory of geological certainty.

The glacial theory leads to the conclusion that the globe had been covered with ice at some period of intense cold; that a change of temperature disrupted the congregated mass into fragmentary portions, which retreated from the higher to the lower grounds, and finally reached the ocean; that the progress tore open and scooped the valleys, and broke the rocks into fragments, which in the lower parts were puddled into clay, and on the higher places were rolled into gravel, by the triturating action of sheets of ice; and that the materials were re-arranged by the huge volume of water that proceeded from the melting of the glaciers. The fragments falling upon, and being carried along by, the flanks of the glaciers, were thrown down in huge masses, which accounts for the groups of gravel that are found in detached beds, and wholly unconnected with any similar materials. These gravels are to be distinguished from the deposits in the valleys, which are most evidently due to fluviatile and fresh-water agency or operations. Erratic boulders are fragments of the rocks which fell singly from the high ground on the retreating glacier, were carried along with the mass, till by the gradual melting of the ice, they reached the bottom of the glacier, and were deposited on the top of the fine deposit underneath, which had been prepared by the moving pressure of the glacier. The volume of melted water afterwards smoothed the surface, and rolled the boulders to the present situations, but still on the top of the lower deposit.

Gravels are mostly cemented in a bed of hardened clay or concreted sand, and are generally covered by an alluvial stratum of loam, of which the depth varies according to the situation and the supply of materials of that nature. These soils fall under the description of "loams." When the gravel bed rises into the light of day, a stony soil is formed, which is very loose in the texture, and incoherent in the mass. When the stratum is thin, and lies upon wet clay, a very poor soil is formed; and also when the mixture of clay constitutes the land of clayey gravel. A mixture of sand forms a soil of sandy gravel, which is generally poor and unproductive, as is also the loamy gravel on a wet clay bottom. These lands most imperatively require draining, and that very frequently done, at the distance of four to eight yards, according as the beds of underlying sand are seen to traverse the beds of clay, and to contain or draw away the water. It is necessary that the drains are cut below the second bed of sand, which will draw down the water from the uppermost stratum, and prevent its rising to the top. These gravels are very stubborn to be ploughed, and are most suited to grow wheat: the quality is generally poor. Being dried by draining, the alternate cropping should be adopted:—1st year, fallow, dunged; 2nd year, wheat; 3rd year, hay; 4th year, pasture; 5th year, pasture; 6th year, oats. This notice understands the clayey gravels that are unfitted for green crops. A mixture of gravel with wet clays and sands forms a very worthless soil, that costs very much labour, and produces very scanty returns. When the beds of sand are parallel, the draining is easy; when they are irregular and contorted, the difficulty occurs of intercepting every oozing channel which conveys the water. The depth of the drains must be beyond the average, and are best filled with broken stones, which present a range of interstitial cavities, for the beds of sand that are cut by the drain. This advantage adheres to broken stones beyond the single tile placed in the bottom with loose materials over it.

A marine formation is found in Norfolk and Suffolk, called "crag," which is composed of sand and gravel, enclosing shells, including also friable masses of ferruginous sand, somewhat cemented together, and also enclosing shells. It is seen at Walton Naze, near Colchester, in Essex, in the depth of thirty feet of the upper part of the cliff, and overlying the under part of fifteen feet of the London clay. The composition exhibits tints which bespeak a very considerable impregnation of iron, and the organic remains much agree with those in the upper marine formation of Paris. The stratum extends forty miles in the counties of Norfolk and and Suffolk, aud the country is level and flat, not exceeding fifty or sixty feet above the level of the sea. The land that rests on the immediate crag is very rich and fertile, and forms one of the most highly cultivated districts in England. The formation is very porous, and water is got by reaching to the London clay underneath. The land being a loam, will be treated under that head. This bed has not been much noticed, but it affords very striking peculiarities belonging to the organic remains it encloses. Conybeare associates it with the Bagshot sand and London clay, as it overlies the latter, which is covered by the former, and the distinction seems somewhat arbitrary between the marine and fresh-water agency. And the distinction is rendered more minute by dividing the appearances into the upper and lower of each formation, which only increases the imperceptibility. The simplification is effected by considering the crag and London clay to be marine, and the Bagshot sand to be a fresh-water formation, as it is much higher placed, and rests upon the clay, which supports the crag, and the latter for its marine character must depend on the organic exuviæ in its composition.

This formation is of the upper marine group, and in that order should have had a precedence of description; but being composed of sand and gravel, it was delayed till these two substances were noticed.

ALLUVIAL DEPOSITS.

The true character of alluvium is seen in the fens of Lincolnshire, Romney Marsh, and Pevensey Level, which are supposed to have been formed, or the formation completed, since the time of the Romans. The component parts differ according to the varied materials which occurred to the agents of formation, the power of its action, the subsequent influences to which the deposition has been subjected. The fens constitute a vegetable alluvium, arising from the decomposition of the forests which has evidently at some former time covered the locality, and which afforded the herbage, leaves, and stems to form the alluvial stratum. The levels of Romney and Pevensey are earthy strata reduced and mingled by the action of water, and covered by the common humified layer of the sub-aërial deposit.

The character of the fens is very different from peat or moss, which is antiseptic and phosphorescent, whereas the former is decomposing and insalubrious. The appearance is mossy, but the nature is soon discerned to be very different. The wettest fens are black in colour; but the greater part may be termed a grey earth, which is cultivable with much advantage. The substratum is "silt," or a finely comminuted mixture of sand and clay, which is very pervious to water, both upwards and downwards. The Lincolnshire fens are seen to overlie the chalk and the oolites, and at their junction the older formations dip under the alluvium. There is no intermediate bed of diluvial reliquiæ.

The drainage of fens and all extensive flat grounds must be begun in making canals, or large open cuts, for the purpose of conveying to the sea the accumulated waters of the drained lands, which are intersected by smaller open cuts, directed in the proper places, and at stated distances, in order to receive the contents of the smaller drains, which are covered by the cultivated stratum of soil. The whole body of waters being directed to the lowest point or points behind the general dyke or barrier, which is raised on a broad foundation and a sloping elevation, for the purpose of debarring the encroachment of the sea, its estuaries and rivers, any number of steam-engine pumps constantly at work will raise the water, and throw it over the barrier, and thus relieve the country of the hurtful mass of the liquid element. Any lands, however flat, may be drained in this manner, and whatever may be the quantity of water.

The best quality of the fens is kept in very profitable pasturage, which has been freed of the superfluous water, and rendered sound for any kind of animals. The inferior kinds which rise towards the high grounds, are more earthy in the composition, and become cultivated soils. Paring and burning has been much practised, and often repeated at not very distant periods of time. Cole is more suitable than turnips, and oats produce more abundantly than wheat. Summer fallowing is unnecessary, and green crops are substituted. Farm-yard dung is the most suitable manure, except the fertilizing produced by the consuming by sheep of the green crops on the land. The light earthy soils that are found on the high grounds where the alluvium *thins* over the calcareous strata, are very favourable to the action of artificial manures; and when a crop of turnips is got, the grain and clover crops do most certainly follow. The general fallow crop being turnips or cole consumed on the grounds, or partly so, and potatoes being grown in some quantity, the cropping will be—1st year, green crops; 2nd year, wheat; 3rd year, clover; 4th year, oats; 5th year, beans, peas, or vetches; 6th year, barley; 7th year, winter vetches; 8th year, oats.

A course of six to eight years is the most suitable and varied in the above crops. The upper soils on the higher grounds are turnip loams, and are cropped under that head.

The marsh of Romney and the level of Pevensey are alluvial flats that have been formed by the joint efforts of marine and fresh water, and which have been located by an orderly operation of the agents of deposition. Similar flat grounds are found around the coast of the south of England, and in valleys by the sides of rivers, which have arisen from the same causes, and which show very similar qualities of composition. The alluvial quality is very generally favourable to the growth and permanence of grasses, and the formations are mostly used for that purpose. Next the sea, they are overflowed by the high tides, and are thought to derive a benefit from the salt oozings that are deposited on the surface, and which are conveyed to the grazing animals. On the sides of rivers, the herbage is often very large and rich, and suitable either for hay or pasture, and often used for both purposes in regular alternation. The fertility of alluvium arises from the very minute decomposition of the ingredients, the number, and varied nature of the materials that are mixed together. Hence, the action of manure is favoured with an abundance of elements on which to exert its efforts; and if repelled in some points, there are others which may be accessible to the influence of its power. Loam is an alluvial of a certain kind, and the value of it as a cultivated soil arises from the same composition in the texture and consistence. Much benefit to cultivation might be adopted by a scrupulous attention to this very prominent evidence of fertility. Natural action in very many cases requires a variety to enable the commencement of its power, and an abundance to continue its efforts; mutual attraction may be weak, or not at all exist, and may be encouraged, stopped, or diverted by mechanical agency. Alluvial formations show the great value of matters being mixed together in quantity, and in the most minute consistence; and though the chemical combination of the mixture may be beyond our power, yet we may by following the processes of nature in the operations of art, make a very useful approximation by means of the mechanical application in the most improved form.

LOAM

Signifies a fat, unctuous, tenacious earth. Under the name of "loam," there is comprehended a class of compound or mixed earths, composed of dissimilar particles, hard, stiff, dense, harsh, and rough to the touch, not easily ductile, while most readily diffusible in water, and usually composed of sand and a tough viscid clay. Loams are very concisely divided into two kinds—the friable and crumbling sorts, composed of sand and a less viscid clay; and the tough and viscid texture, that are composed of sand and more adhesive clay. The colours have also been used to distinguish loams—the black and white, which are not acted upon by acids; yellow loams, some of which are acted upon by acids; the alkaline brown loams, that are acted upon by acids; and the green loams, that suffer no disturbance.

According to Woodward, loam consists of clay mixed with fine sand, or of clay with a superabundance of sand; and Mr. Bergman found a good loam to contain 87 per cent. of reddish-grey sand, as fine as meal, and 13 per cent. of argil. Supposing clay to contain, as it most frequently does, 70 per cent. of fine sand, we shall find, as Mr. Kirwan observes, that loam of the best kind contains an excess of sand amounting to 17 per cent.; if the excess of sand be greater, it will form a soil of "sandy loam;" if smaller, a "clayey loam." When anything calcareous is found in the loam, it inclines to the nature of "marl," or a marlaceous loam, which may be either sandy or clayey, according as the proportion above indicated is exceeded on either side. But loams most frequently contain a portion of the calx of iron, which is more or less oxygenated—a circumstance which produces a considerable variety in the colour, and very probably also in the vegetative powers of the loamy earth, if its proportion be considerable, viz., 4 to 5 per cent.: they often contain also some proportion of the vitriolic acid. The sandy part of the loam has much effect in giving the colour. When gravels and pebbles are mixed with loams, the distinction arises of "gravelly, stony, and silicious, and limestone loams," according as the substances predominate.

Loams are generally understood to consist of clay, silicious sand, and the carbonate of lime. The quantity of iron, magnesia, and various salts is so inconsiderable as never to alter materially the texture of the loam. Decayed vegetable and animal matters in the form of "humus" are often found in loams in very considerable quantities, and the soil is fertile in proportion. Loams vary in quality, according as they are composed: those composed of loose sand with little humus, and with an impregnation of iron, are very unproductive; and those which contain too much clay, and lie upon an impervious subsoil, are very difficult to cultivate. Between these two extremes there are soils that form the very best that are found on the face of the earth. Loam seems to be naturally formed for the purpose of fertility. The pure earths are in themselves almost entirely barren; sands receive and discharge moisture much too quickly; clays retain it too long in its own substance, refuses it when wanted, and starves the roots of plants in a cold impervious mass; chalk has the same mechanical quality, and contains very little organic or soluble matter. Sand and clay alone would not make a rich soil; but a portion of calcareous matter and of humus being added, the mass is rendered open and porous, and the clay and sand prevented from forming a mortar, which hardens too readily, and prevents the influence of the air from reaching the roots. The invaluable quality of loams is the texture allowing the due circulation of air and moisture. All fertile soils contain some portion of calcareous earth. Moist climates require a greater portion of sand to make a fertile loam, which will be less necessary in proportion as humus abounds. The climate of England requires one-half of the soil to be sand, one-third of clay, and the rest to be chalk, to form a good loam, and rather light than heavy. Loams require less tillage than stiffer soils, and will bear more stirring to clean them than sands. The produce is always certain and abundant. Every kind of manure can exert the proper action in loams, as they find a variety of substances on which to apply their influence. All kinds of crops that are known thrive well on loams, and animals may be safely depastured upon them during the whole year. The best subsoil for loams is a compact gravel, which receives the moisture downwards, so as not to starve the upper soil, and retains a sufficiency to be given out in drought, as the upper soil may require it for use. A dry porous clay is often seen to support a good loam.

The composition of a fruitful loam suggests some very important considerations in the science of agriculture. Every article of commerce possesses some property by which the quality is judged, and according to the quantity of which the relative marketable value is ascertained. And by increasing or diminishing the criterion of quality, the value is raised or depressed. Nature affords the inherent mark of value; and when it is wanting, it is the object of cultivation to create it artificially. The constituent parts of a good loam being correctly ascertained by chemical analysis, and the deficiencies of inferior soils being also learned from the same source, it only remains to supply the wants in the latter, as they appear in comparison with the former. If clay be in excess, chalk and sand may be added, and a portion of clay may be burnt in order to destroy the attraction for water, and thus act the part of sand in helping to form the loam. Limestone, gravel, and sand are also very useful for this purpose, as they equally correct a too great porosity, or a too large degree of tenacity. If there be too much sand in any loam, clay and chalk will be the remedy. And though the utmost art of man is able to effect *only* a mechanical mixture in place of the chemical combination of the substances that are sought to be amalgamated, yet the repeated stirrings which the land undergoes in the process of time, and the opportunities that are thus afforded for the effecting of reciprocal unions, may tend to lead to the more perfect blending of the mixed ingredients, and the assimilation of the elemental matters. It might be an interesting and highly useful inquiry to ascertain the effect of the contact of various kinds of earth moistened with water in exciting galvanic action, which, no doubt, greatly influences the chemical affinities of the elements from which the plants derive their increase. This subject has scarcely ever been noticed; but no part of vegetable physiology deserves more attention.

HUMUS,

In the literal meaning, understands a moist earth, or more modernly "mould." It is classed in mineralogy as a genus of the order of calcareous earths. Generic characters—consisting of carbonate of lime, with a small proportion of silex; hydrogen, carbonic acid gas, and oxide of iron, formed by the decayed remains of animal and vegetable substances; light, friable, imbibing but not retaining water; meagre, rough, humid, of a dull colour, effervescing with nitric acid, becoming cinereous in a smaller heat, in a stronger running into a frothy kind of glass.

"Animal mould" is impalpable, greedily imbibing water, hardly effervescing with nitric acid in its rude state, but sensibly so when burnt; white or cinereous, very light and fertile.

"Vegetable mould" is brown in a very subtile dust, so very fine as, when mixed with water, to pass through coarse cloth or filtering paper. It affords the best and richest garden moulds, and is often black when moistened, and cinereous when dry. Decayed vegetable matter affords a most excellent soil.

Animal and vegetable moulds being mixed by their elements living and decaying on the surface of the earth, form the "humus" of modern scientific agriculture, a natural manure produced by the slow decay of animal and vegetable matters. "Humus" is a dark, unctuous, friable substance, nearly uniform in its appearance: it is a compound of oxygen, hydrogen, carbon, and nitrogen, which, with the exception of nitrogen, are the elements of all animal and vegetable substances. It is the result of slow decomposition of organic matters in the earth, and cannot be compounded "chemically." It is the product and the source of living matter. The greater the number of living creatures, the more humus is formed; and the more humus, the greater is the supply of nourishment to life. Every organic being adds to the quantity of humus, which increases as men, animals, and plants increase upon the earth. It is diminished by the process of vegetation, and wasted by being carried away by water; or it is carried into the air by the agency of oxygen, which converts it into gaseous matters.

Humus, in the common state, is not soluble in water, and it is antiseptic. It is indecomposable in itself, and in other substances in contact with it. It remains in the earth long unimpaired; but so soon as it is brought to the surface by the process of cultivation, an action immediately begins. The carbon of the humus unites with the oxygen of the atmosphere, and forms carbonic acid, which the plants absorb; the hydrogen, by the same affinity, forms water, and this moisture being formed gradually, becomes a most valuable source of life to plants during dry seasons, when rains and dews are deficient. Soluble extract is the residue, which is taken up by the roots of plants. By the repeated action of cultivation, a further progress of reciprocal unions is produced, which afford a regular supply of food to the plants; and from this fact we learn the great value of frequently stirring the ground in the culture of green crops.

Humus renders clays porous, and consolidates loose sands, and suffers very much from stagnant water; the substance is rendered acid and astringent, as in peat; the vegetable matters become "sour," and produce rushes, and other unpalatable and useless plants. In such cases the land must be dried by draining, and the acid neutralised by large applications of lime. In light soils very little humus is found; the air penetrates too freely, and speedily decomposes it, and the extract is carried downwards by the waters that pass through the soil. Such soils want being consolidated by clays and moulds, to make them retain moisture. Humus acts most fruitfully with calcareous soils, provided they are deep and well pulverized.

Good lands contain at an average about 4 or 5 per cent. of humus, and 2 per cent. will render a soil tolerably productive. Humus being the production of animal and vegetable matters combined, it is yielded in abundance by farm-yard dung, which consists of the straws of the cereal crops joined with the solid and urinary fæces of the animals. And it is to this quality that the dung of the farm-yard is indebted for its superiority to any other manure yet known—that after the more active animal substances have exerted their action, and have disappeared, there remains in the soil a residual mass for future decomposition, and which continues to afford for years the *pabulum* of organic life.

Loams being formed, by nature, of the mixtures of the primitive ingredients that have been now mentioned, partake very largely of the capricious diversity that is everywhere to be observed in the productions of unknown agency; the position is very varied, and the quality seems to be regulated by no definite rule that observation has yet been able to trace. The tops of moderately high grounds very often contain a greater depth of loam than the adjoining valleys, and the quality is also much more valuable. The most stubborn clays are often found on low grounds, and are comparatively unproductive, while the adjoining heights are crowned by a loam of more than medium fertility. The quality of the substratum has a very evident effect in conferring a value upon loams. If it be rocky, the loam is usually too dry and incoherent; if clayey, the loam will be wet and ungenial; if sandy, it will be too open and porous; and if gravelly, it will be liable to be scorched. The most fruitful loams are found incumbent on a bottom of clayey sand or compact gravel, joined and mingled together in such a manner as it receives the moisture downwards, and does not starve the upper soil, and at the same time keeps the moisture in store to be given out as the upper soil may require it. A gravel cemented by clay, and made porous by sand, is of all others the best adapted for the purpose now mentioned. A yellow and compact unctuous clay of a dry nature often supports a loam of the first-rate quality.

Humus appears to be most certainly distributed by the quality of the soil, land, or ground on which the animals and vegetables best like to live. All organic beings have the instinctive faculty of choosing and rejecting; and accordingly the greater abundance of humus is always found or strata which experience has found to be most favourable to organic life, and the original deposits that are constitutionally inimical to the living organs of the creation are left devoid of any useful quantity of that essential element of fertility, and require to be supplied with it by artificial means. Humus is therefore produced by one natural productive quality that favours the generation of living organism, and it affords in return the elements of life to subsequent reproductions. The earthy vegetable matter, being the residuum of the decomposition of organized bodies, is a principal material in soils; it constitutes the layer in which plants grow, and differs greatly according to the quantity and quality of the matter itself, the state of reduction it has attained, and from the manner in which it happens to be incorporated with the constituents of the soil. It has much influence on soils, in altering, modifying, and mixing the original substances of their composition. The depth of it determines the fertility of lands.

LOAMY SOILS.

These lands comprehend the most valuable parts of the cultivated earth, and are very widely diffused in many differences and modifications. But the large variety may be conveniently reduced to three heads—clayey loams, sandy loams, and gravelly loams, comprehending also chalky soils of that grade.

The first class, or clayey loams, is the best soil in Britain, as it grows the most valuable root-plants, and the cereal crop of the most value. It lies not upon the clays that have been before described, but upon a vast bed of alluvial earth, sometimes approaching to clay, which has been superimposed upon the original deposits by the agency of some operating power both of preparation and of location. The best quality is recumbent on the new red sandstone, and on the huge beds of alluvial clay and diluvial beds, which are found in the level districts of England. Where the soil approaches the sandstone rock, the substratum is called the red marl, and has evidently been derived from the rock itself; and the cultivable stratum has proceeded from the under-bed by the process before detailed, and by the effects of exposure to the air in the movings of the soil by the implements of culture. The constitutional quality is favourable to the congregation of organic life, and has gathered from the exuviæ the essence of its fertility. In other places, the rocks are deeply covered by thick beds of an extraneous deposit, very frequently an unctuous clay that is retentive of moisture, but does not require draining. The lands on these two subsoils form the best quality in Britain, producing the most valuable crops in a large abundance. The best system of cropping is:—1st year, green crops, turnips, beet, and potatoes; 2nd year, wheat or barley; 3rd year, hay;

4th year, pasture; 5th year, oats (or 4th year, oats; 5th year, beans); 6th year, wheat.

This latter form includes every plant of cultivation, and understands the use of barley after the green crops, that wheat may not occur twice in the rotation. These lands permit the action of every kind of manure, owing to the varied composition of the soil.

SANDY LOAMS

Recline on dry beds of alluvium, of dry clay, concreted earth, and deposits of a heterogeneous variety. The quality is everywhere dry, and very favourable to the action of artificial manures, from the warmness and fineness of the composition. They form the true turnip soils, and produce that plant in the quickest readiness and largest abundance. Barley and clover are also choice crops on these lands, which allow the eating on the ground by sheep of the turnips, and also the sound pasturage in grasses. Every animal and plant thrives upon them, and every manure exerts the full power. The best rotations of cropping are:—1st year, turnips; 2nd year, barley; 3rd year, hay; 4th year, pasture; 5th year, oats; or 5th year, pasture; 6th year, oats. The soils are often formed of alluviums on the banks of rivers, which are inert by reason of the want of calcareous matter, which must be supplied in the shape of lime. The very intimate mixture of the materials constitutes the value of loams, the subjacent formation, and the exuvial matters which it has been able to attract.

GRAVELLY LOAMS

Are situated principally on the tops of gentle eminences, and on the slopes of declivities. The beds of gravel on the banks of rivers are of alluvial origin, and fall under a different denomination. Loamy gravels are not the richest soils, but are very friendly to the growth of turnips and barley; the pebbles retain a coolness for the roots of the turnips, and the grit of the gravel produces a thin-skinned barley, much valued for malting. But the produce of any crop is not bulky. Being dry, they admit the sheep to consume the turnips on the ground, and the land is thus very much benefited. The rotations of cropping are as last mentioned.

Chalky loams are similarly treated. Subjoined is the list of grasses to be sown in the fore-mentioned rotations:—Ray grass, ½ bushel per acre; cock's-foot, ¼ bushel; meadow-fescue, 4lbs.; crested dog's-tail, 4lbs.; meadow cat's-tail, 4lbs.; meadow poa, 4lbs.; red clover, 8lbs.; white clover, 4lbs.

CONCLUSION.

Though the grand problem of geology may never admit a fixed and determinate solution, yet there is not a more sublime speculation in physics than to attempt the resolution of problems which nature suggests on such a magnificent scale as is presented to our wondering eyes by the globe which we inhabit. A wish or an attempt of this sort can never be condemned. A very large portion of mankind content themselves with a smile bordering on contempt when they casually listen to such speculations, and a superficial observer is generally struck with the character of extravagance which appears so prominent in the hypotheses that are assumed. But no hypothesis is to be reckoned extravagant for the subject that is confined within the limits of possibility. The disposition of the strata of the earth is itself extravagant, if we be allowed to apply this epithet to any one of Nature's works. The general character points to causes so very different from any that we see in actual operation, that no hypothesis is to be rejected for its strangeness, and hypotheses of this sort are wholly unavoidable by all who attempt to explain the phenomena that appear before them. The unexplained phenomena of magnetism, particularly the fluctuating variations of the needle, and the supposition of the interchanges of materials among the different planets, countenanced in some measure by the well-authenticated instances of stones falling from the atmosphere, will perhaps, at some future period, lead to a modification, or probably to a total change of our geological theories, or to the formation of others. Much real progress might be made if the writers of such works would confine themselves to proceeding step by step, drawing only immediate and necessary consequences from accurate observations, and leaving to future ages the care of advancing further in proportion to the knowledge thus acquired; and many general facts would be better ascertained by this safe and impartial method than by continual attempts of these authors to square them to their fanciful systems. From the impatience to give general theories before solid foundations have been laid for them, the most airy hypotheses are successively obtruded on the public, each destroying the former, and itself enlarging but very little, if at all, the boundaries of real science. But some advantages always attend such wild attempts; the objections made against the preceding systems are useful, and in the course of reasoning some observations are made, and some conjectures thrown out, which deserve to be remembered and kept in store after the illusory vision which it was made to prop has vanished and sunk into oblivion.

A very great part of human knowledge is speculative or guess work, and it is by no means an unpleasant employment for a vacant hour to exercise the judgment in determining which author we think has the farthest stretched the power of speculation, or which of the many would-be solvers of the grand problem of geology has guessed the most plausibly. And if no permanent improvement or substantial information can be derived from the ideas which they entertain, some benefit may possibly be gathered from the language which they employ.

Extensive observation and long-continued experience have shown that by the combined influence of air and water, and of vegetable action, rocks are decomposed, and that the hardest masses are not proof against this change, which will go on with greater or less rapidity, according to the construction of the rocks, and the power of the operating agents of disintegration. In hot climates, which produce a luxuriance of vegetation, its progress will be rapid; in cold latitudes, it will be much slower; but slow or rapid, all substances are liable to decomposition, and even the purest crystal is deprived by exposure of its fine polish and brilliant lustre, and the beginning of a new coat commences. Soft and porcelain granite has been mentioned, which contains quartz, felspar, and mica. The quartz is almost pure siliceous earth in a crystallized form; felspar and mica are compound substances, and contain silica, alumina, oxyde of iron, and magnesia. By exposure, the lime and potassa are acted upon by water or carbonic acid, the oxyde of iron tends to combine with more oxygen, and the mica and felspar are decomposed, the latter more rapidly. The felspar forms a fine clay; the mica, more partially reduced, blends with it as sand; and the harder quartz will appear as gravel, or sands of different degrees of fineness. The seeds of lichens, and of plants floating in the air, fix themselves upon the first appearance of earth, and by their death and decomposition, afford a quantity of organized matter, which mixes with the earthy materials of the rock. More perfect plants succeed and perish, and add a succession of increasing materials; the rock continues to decompose, and by slow and gradual processes a soil is formed, in which plants and the largest trees are produced.

This is the generally received opinion of the formation of soils from the detrition of rocks by the force of external agencies, and that the disintegrated materials have been carried by floods to the ocean, and there accumulating, are formed into horizontal layers. But the decay of rocks themselves must be very gradual. In some dry countries, inscriptions are perfect, and the angular shapes and edges are but little blunted after the lapse of 20 centuries. The formations that are taking place in the present quiescent state of the globe are made by the sea, fresh-water rivers, and by lacustrine deposits from substances collected and rolled along by the course of waters over the earth. These depositions go on in many places visibly, though slowly; but we know little of the processes by which the vast alluvial deposits have been made in all the different arrangements, mixtures, and combinations, to the depth of several hundred feet, and extending over vast tracks, of various and discordant qualities; or of the means employed by nature in the processes of alluvial deposition from the detritus accumulated at the foot of mountains, from the decomposition of rocks, and of the subsequent removal and consolidation, or even of the operation by which animal and vegetable exuviæ are converted into soil. As before observed, rocks and soils differ widely in the quality, and other agents must have been employed than the decomposition from exterior influences.

The petrifactions and organic remains found in the various substances that compose the earth, as far as it can be examined, seem sufficient to place one fact beyond dispute—that the globe has undergone many extensive changes; and it is not a little curious that they are confined to particular formations, and are not found in contiguous strata; and that the remains of trees and vegetables are found only in some few similar situations.

In the tranquil forge of Nature's wonderful and stupendous works, the most sublime harmony and profound silence prevail; and were it not for the admonitions that obtrude on our senses, from the lapse of time, the results would scarcely be perceptible. In that workshop we do not hear the blast of the furnace, or the reverberation of the stroke: the torture of analysis, the war of the elements, of acids with the alkalies, are nowhere discovered; nor the use of tests and precipitates, agents or reagents, in producing the work of combination and resolution. One grand principle is everywhere at work, pervades every atom of particle, and, in conjunction with the vivifying effects of light and heat, brings into existence and matures the germs of animal and vegetable life. A modern theory supposes all effects to arise from the motion and reciprocal action of existing substances, and consequently cannot be produced by natural processes, unless the elements already exist. But of the mode of preparation of the various substances for that purpose, and of the state that is necessary to engender life and support it, we are wholly ignorant.

In the absence of any kind of certain data to guide the search of enquiry, curiosity will lead to many suppositions, conjecture will be busy, theory will succeed theory, often serving no better purpose than to refute the foregoing—a matter of little difficulty on many points of speculative knowledge. After all the extensive investigation and laborious research that have been employed on the subject, it is very probable that the formation of rocks, and the other formations that are supposed to have been subsequently derived from them, the process, manner, and operation by which all the formations have attained the present form, quality, and position, may remain for ever a subject of uncertain speculation; as no analogous formation is now taking place, except in one class of rocks—the volcanic.

The time that would be required to bring many of the substances that have been mentioned to their present state varies in different theories from 1 to 200 years, and the depositions from 12 inches in 100 years to 15 inches in 1 year. Such wide discrepancies and contradictory opinions render any approximation hopeless; and we may very reasonably conclude that our weak and unassisted reason may never be able to penetrate the veil of obscurity which Nature has drawn over many of her works, and that our labours and researches may never lead to any satisfactory conclusion on the great works of creation, many of which would appear to be forbidden to man, and destined to elude his curiosity. But such intimate knowledge is not required for the useful purposes of man: external observation and experience afford an abundant source of employment for the time and energies of the human race; and though these abstract speculations have not afforded, either from physical or scientific theory, any assistance to the operations suggested by observation and external impressions, yet perseverance may probably lead to a valuable discovery, as has already happened in similar pursuits. Such subjects, even if they never produce any result applicable to public utility, are nevertheless in themselves highly worthy the attention and study of rational beings; they enlarge the circle of knowledge, ennoble our sentiments, refine and exalt our ideas, and direct us with the most profound reverence and devout admiration to the Great Source of Being, who from nothing called into existence the great mass of objects that so far exceed our comprehension, and who, from all the seeming irregularity and confusion we behold, hath disposed in the most beautiful order and harmony the whole system of creation, teeming with abundance, bestowing life, and affording health and comfort and the means of existence to all the numerous varieties of animated and organized life, and forming a source of supplying to the inorganic creation the materials for producing the different substances, which, wrought by art and fashioned by ingenuity, contribute so much to the comfort and happiness of man in the numerous and varied departments of civilised life. J. D.

ON THE STRUCTURAL FORMATION OF THE LEICESTER SHEEP.

The Leicester sheep occupies the first place among the native breeds. Not that the Leicester is in ordinary circumstances so profitable, when kept simply for the purpose of producing mutton and wool, as some of the other breeds, or rather crosses with other breeds; but their value as sheep rests mainly upon their peculiar adaptation for crossing—imparting to the cross-bred animal much of their size, early maturity, and quickness of fattening, with ampleness of fleece—the fleece of the cross-bred possessing length of staple, and varying, according to the character of the fleece of the dam, from medium fineness to almost first quality. The superiority of the Leicester sheep consists mainly in imparting in a high degree to the animals so bred those qualities which characterise the Leicester, and which no other breed possesses in the same perfection. A well-bred Leicester, therefore, should unite, as it does, all the qualities which are desirable in the sheep.

It is well known that we owe the Leicester sheep to the late Mr. Bakewell of Dishley, in Leicestershire, the breed being generally known on the continent as the Dishley. As Mr. Bakewell studiously concealed the methods he adopted to produce the Leicester, it is useless to discuss what can now never be definitely ascertained. There can be no doubt, however, that the Leicester was the result of very considerable research into the proper characteristic traits of the different breeds of sheep, and into the formation of animals generally, with the exercise of constant application, governed by a sound judgment in selection, developed with care in general management. By these means the character of the Leicester was stamped, and it is in the exercise of the two latter—selection and management—that the characteristic features of the Leicester are to be perpetuated. Not that a breeder can, like Bakewell, select from different breeds, and and so produce a pure Leicester sheep, or can even, by constantly selecting animals from the different herds of Leicesters now in existence, produce and perpetuate a breed of very high character. The forming of a breed with established characteristic features is what very few men are capable of effecting. There are few Bakewells and Collings; and even if there were, the difficulties of creating a breed, not to say an improved one, with fixity of type, over those now in existence, are much greater than they were at the period these eminently successful breeders lived. Any attempts, which have come under our knowledge or observation, in the improvement of Leicester sheep by crossing different breeds of Leicesters, have ultimately resulted in disappointment. Superior animals were obtained generally in the first produce, but there was a sensible deterioration in the second and third generations. The most celebrated flocks are bred pure, and are kept pure, from animals obtained directly from Bakewell's flock. There are, however, many flocks of Leicesters not so descended, being generally the produce of tups obtained from Bakewell and other breeders of Leicesters since his time, to cross their original flocks. Some of these have doubtless a dash of the Cotswold or Lincoln, however far back or recently introduced, most probably with the view of giving a greater degree of stoutness of frame with size to the flock. There are few breeders, however, who can patiently discuss this point. Each believes his own flock to be the *Simon Pure*. It is dangerous ground—the purity of Leicesters as descended from Bakewell's flock. As we are without a Flock-book kept like the Stud and Herd books, it is, indeed, hopeless to trace purity of blood to Bakewell's time. The character of the breeder is therefore the best guarantee, so far as he knows, as to purity; but as many breeders introduce occasionally fresh blood into their flocks, the belief cannot amount to a certainty. But there are certain features characteristic of the pure, that is, the Dishley Leicester, which can guide one conversant with Leicesters.

The following description of the points of greatest importance in judging of a Leicester sheep may therefore prove of value to some of our readers. It may be remarked that all the desirable properties are never united in equal perfection in any one animal. In a proper selection, therefore, all that can be done is to choose where there is an approximation nearest to what is desired, and with those points the most developed, which are of primary importance.

The first is purity in descent. Without this, defects not visible to the eye will be perceptible in the produce, from these defects being hereditary. But in the show-yard, purity of descent must be judged of mainly by the characteristic features of the Leicester. The formation of the head and colour of the face and legs are good evidence of purity of blood. The sheep should be of a fair medium size. Diminutiveness is, however, more objectionable than extra size, particularly in the female. The head should be long, muzzle fine and tapering, lips pliant, opening of nostrils long and delicately formed; in the male, considerable breadth between the eyes and ears, and in both male and female, the eye should be large, lustrous, and expressive. The jaw open, and in the male, clean and well defined. The ears should be rather long, placed wide apart, showing breadth and fulness of the development of the muscles of the neck. In some flocks, the ears are slightly pendulous; in others, they are more erect; the former indicates largeness of frame; the latter, compactness of frame. The colour of the skin around the eyes and muzzle should not be too white. Some of the purest flocks have the face thinly covered with fine short downy hair, of a dull light slaty colour, or a dun red. This tinging of blue or dun is also apparent in the legs. The slaty colour of the face gives to some an impression of the animals being *too fine*, a vague impression of delicacy of constitution being associated with this marking. How this colour was acquired cannot now be ascertained. It doubtless had its origin from some cross employed by Mr. Bakewell when forming the Leicester breed. The colour of the skin of the body should be a light pink colour, showing an abundant supply of light buff-coloured yolk. To this we will afterwards revert. The skin should be loose, with a tendency to folds in the neck, dewlap, and flank; smooth tight skins are evidence of delicacy in constitution, of light fleeces, with a want of wool-covering, particularly on the belly.

Symmetrical structure is of the very greatest importance. The body should be long, the neck of medium length, and, in the male particularly, well raised with full developed muscles. This is a certain indication of the whole muscular system being properly developed, a highly important condition in the Leicester, although not unfrequently comparatively absent. The back should be level, broad, equal, and, when viewed from above, the sheep should have somewhat of an oval form from the neck to the setting on of the tail, the barrel swelling out, showing that the ribs are properly raised from the spine. The shoulders should not bulge out, this being an indication of coarseness, and an absence of stamina in the constitution. Behind the shoulders, should be full, and when felt by the hand should feel firm. A defect here, like that of the want of muscle in the neck, not unfrequently attends the Leicester, and both are generally found in the same animal. The point across the loins is one of great moment; but if the muscles of the neck are well developed, they will almost invariably be equally developed here. The hind-quarters should be long, and of medium breadth; and should be rounded rather than square, the square being a characteristic of the Cotswold: the breadth should be greater in the female than in the male. There should be no patchiness at the sides of the tail or elsewhere, however fat the animal; the whole covering of flesh and fat being equally laid on. The touch should be soft, yet firm, yielding when pressed, but quickly regaining its fulness with the removal of the pressure. This elasticity of touch is a certain indication of health with condition. The tail should be broad at the setting-on, and well covered with wool; at the top of the tail, and along the back, an indentation should be sensible to the feel. The extent and deepness of this indentation depend mainly upon condition as regards fatness. The chest should be full, deep, and wide, coming well forward between the fore legs. When the sheep is turned, this fulness of the brisket should be prominent, and well covered with flesh and fat, it being a safe indication of constitution. The fore legs should be placed wide apart, straight, with a very slight inward bend at the knee joints. The legs should be of medium thickness, and rather small than otherwise, with well-developed joints. The belly should be light, somewhat tucked up at the flank, especially if the sheep is young. The muscles of the thighs can scarcely be too much developed, whether on the inside or outside. The point, commonly called the twist, should be prominent; the hock joints large; the legs lathy, nearly straight, having a slight bend inward, and backward at the hock joint; the feet should always be large, the cloven parting in the hoof being distinct when pressed. The value of the sheep is dependent in no small degree upon the powers of locomotion, although this is often neglected by judges in show-yards. The animal should step firm, be gay and lively when in motion. In the male the carriage should be majestic; in the female, more docile, but not lethargic. Such animals will not only prove more healthy, and be the propagators of healthy stock; but will subsist and even fatten upon more stunted fare, than animals possessing less natural vigour could subsist upon and continue in a state of health.

An important element of value in the keeping of sheep, the fleece, does not generally take the position to which it is entitled. It has been argued that the difference in value between an indifferent fleece and a fine fleece of the Leicester breed does not exceed one shilling, or, at most, two; while the difference in value of the carcase frequently exceeds ten shillings. This is, no doubt, so far correct; but it is not the proper way of estimating the value of a fine fleece. The wool is a natural protection against cold, dampness, and external accidents. A sheep well furnished with a woolly covering for the belly and legs, is in a different position as regards the maintaining of health than one deficient of wool, particularly on the belly. Sheep destitute of this covering for the belly, flanks, and legs are not so well adapted for ordinary treatment as sheep possessing such a protection. The face, particularly the forehead, should be partially covered with wool, especially during the winter. Those sheep possessing such will have generally more uniformity as to quality with closeness, length, and compactness of fleece. A close, thickset fleece, of length of staple and fineness, with uniformity of quality over the whole body, is, indeed, a certain sign of purity of blood, and as such should never be lightly estimated in judging a sheep. The length of staple and compactness of wool are partly influenced by the manner of feeding, and the shelter and the nature of the climate, especially as regards humidity. A damp climate tends to produce a compactness of the fleece, with a tendency to coarseness on the flanks and thighs. Leicesters, therefore, which are protected from the effects of damp climate by shelter, however provided, are in a better position for exhibiting a fine fleece. Food no less exercises an influence. It is found in Germany, where the sheep are all housed during winter, and the Merinoes during nights and damp days in summer, that sheep, fed on hay as fodder, produce less weight of wool than those fed upon a mixture of hay and straw. The quantity of roots allowed is also known to influence the weight of the fleece. Sheep intended for exhibition have occasionally the fleece prepared previously. At the period of clipping, the wool is not shorn so close along the shoulders and sides as on other parts of the body. This preparation imparts to the eye a greater breadth of figure to the animal. Sometimes the shears are used to dress the ends of the fleece, previous to exhibition. It is difficult to make rules to meet the arts occasionally practised by exhibitors in the different departments of an agricultural exhibition.

It may be so far necessary to enter into the question of openness or compactness of fleece, from the prominence which it has recently assumed among competitors at exhibitions. There is great diversity of opinion among breeders of Leicesters as to open and close fleeces. This, as we have already stated, is partly influenced by the treatment the sheep is subjected to. This, continued through a succession of years, fixes in part the character of the fleece as to openness. The character of the soil upon which the sheep are kept also influences the size, figure, and general *contour* of the sheep, and with this also the character of the fleece.

We have previously alluded to the skin. Now, as the secretion of the wool depends in no small degree upon the character of the skin and the fatty tissue under it, it thus acquires more importance. A Merino, not possessing a loose skin, and not displaying the folds, would be at once rejected, on the ground that the weight of wool and quality thereof would be inferior. The same law is in operation in all sheep. If the sheep has not been recently washed, the fleece when opened up should present the skin of a pale rose hue, and there should be present that oily yolk ascending from the skin through the whole length of the staple, assuming towards the extremities a darker yellow. Sometimes the skin and wool present gummy yellow scales, something like ear-wax, adhering to the wool. This appearance is objectionable, as showing a diseased state of the oily secretion, which will be exhibited in the wool having irregularities in the staple with dead ends. The strength, elasticity, softness, and lustre of the wool can be judged of by minute inspection. As a rule, the greater the number of spirals in a given space, the finer the fibre of the wool; and apart from the increase in value of the fleece, fineness is the best evidence of the bodily health of the sheep, and also of strong constitution. It is held to be a physiological truism, that with high feeding and a tendency to increase the fatty secretion in any breed of sheep, the fibre of the wool becomes larger, and consequently coarser. This fact, from the general over-feeding of Leicesters, is only an additional argument for the necessity of attaching more importance to fineness with uniformity in the fleece of the Leicester, if it is to continue to be the propagator of so large a proportion of our home wool-producers.

RECAPITULATION.

1. Purity of blood in both male and female progenitors.
2. Muscles of the neck fully developed, particularly in the male.
3. Eye large, clear, in the male prominent.
4. Head of medium length, broad between the ears, muzzle fine, jaw open.
5. Chest deep and circular, with brisket full.
6. Barrel well arched; loins broad and full; body long.
7. Touch of medium firmness, possessing elasticity.
8. Skin loose, throat clean.
9. Wool fine, equal in the spiral curl, uniform in quality throughout the fleece; staple of full medium length.
10. Belly, flanks, and thighs well clothed with wool.
11. Shoulders well laid, the fleshy covering filling up the sides of the neck, where the shoulders join.
12. Quarters long, level, and rounded.
13. Thighs full, the cleavage of the thighs being near the hock joints.
14. The whole surface of the bony structure of the body evenly covered with muscle and fat.
15. Hock and knee joints large. The leg bones fine.
16. Legs somewhat short, firmly set, with hoofs well defined.
17. General appearance gay, and in the male majestic. In both, the step firm.
18. Belly light, showing little offal.

A communication from Mr. Grey, of Dilston, appears in the present number, and which came to hand after the above was written. The black spots to which Mr. Grey alludes are regarded by some breeders as good evidence of purity of blood, although sheep without such spots are generally preferred. It is a somewhat curious fact, which we have never seen noted, that many prize sheep have had this black marking. Our readers may also remember that we alluded to it in our notice of the Imperial flock of Merinos kept at Rambouillet.—*North British Agriculturist.*

LEICESTER SHEEP.

Mr. Miller, of Oldhamstocks, has described, in a late number of your journal, what he considers to be characteristics of a pure Leicester sheep, enumerating the particulars in shape which are desirable in that and every other breed, though more generally and more fully developed in the Leicester than in any manner. Every one knows, and it is capable of demonstration on mathematical principles, that a straight and well filled-up line from the neck to the tail, deep perpendicular breast and thighs, with a broad back and round ribs, will give a greater solid contents than a shape of less regular outline and of less equal proportions; while the beef or mutton is also more evenly mixed, and better than that of animals with points of peculiar prominence, or what breeders call *patchy*. In all that part of the description, every judge of the animal will agree. But Mr. Miller has made two remarks, to the correctness of which I am inclined to demur, and that from old experience. He states, as essential to a pure Leicester sheep, "a long narrow head, with strong legs perfectly white and free from wool; and that he never understood that gray or dun legs were an indication of a pure and original breed, handed down from the Bakewells and Collings."

Now the Leicester head is wide at the ears, and tapering to the nose. The legs are not thick and strong, but rather small, indicating little offal, nor are they covered with a purely white skin. The head and legs which Mr. Miller described, covered with a wiry white hair, are characteristic of the

Cheviot, but not of the Leicester sheep. Then as to the dun legs which he repudiates, my experience of Leicester sheep extends to more than 50 years; and it is about 50 years since I hired a ram, at the highest price I ever gave for one, and, as I think, the best I ever had in both shape and quality, whose legs were dun or approaching to red, and who possessed the recommendation of being descended from a celebrated ram of Mr. Bakewell's, called "Redlegs"—a strong proof that such legs belonged to the earliest improved Leicesters in the hands of that distinguished breeder, as did also the black spots on the ears, which characteristics, as I shall venture to call them, are occasionally found to this day in the stocks which are considered to be the purest of Leicesters in the counties of Notts, Leicester, and Lincoln.

I have no liking for controversy, and deprecate anything like ill-humour and personality where the object is to elicit truth. I respect Mr. Miller for having stated plainly and temperately what are his opinions, and for having appended his name to that statement, instead of covering it under an anonymous signature, which is also the invariable practice of your obedient servant,

Dilston, Jan. 27, 1855. JOHN GREY.

CALVES.—ON THE PREVENTION OF DISEASE.

There appears at present to be, in many districts of the kingdom, an unusual mortality among calves, this mortality arising most commonly from the diseases known as black-leg and pleuro-pneumonia. As these diseases are usually traceable to errors in feeding and in general management, we take the liberty of making a few remarks in reference to the treatment of calves.

Pleuro-pneumonia, although it is a disease less under control, and its appearance among cattle usually owing to infection, still is not unfrequently superinduced by general mismanagement, particularly by exposure to an impure atmosphere—to cold, wet, and sudden changes of temperature; these causes being aggravated by errors in feeding, generally from a state of semi-starvation to forcing.

Among ordinary breeders of cattle there is a prejudice against furnishing to calves a liberal supply of rich, succulent food, from an idea that calves will grow as well, or even better, when kept on hard fare, and consequently in low condition, and exposed to hardships, than when kept in high condition from the period of their birth; and also that, when put up to feed, they will *lay on* flesh faster, and make more improvement for the food consumed. Indeed, the idea extends even farther than this—to the belief that high condition is productive of disease. How these ideas arose, and by what process of reasoning they continue to keep such firm hold of the minds of farmers, it is somewhat difficult to account for. They doubtless influence more or less the practice of most breeders of cattle, and tend to deteriorate the animals so reared. The privations undergone injure their constitutions, which tends to produce diseases, frequently resulting in death. When diseases are not superinduced, the animals are physically injured from these causes, which stint their growth, impair the valuable property of laying on flesh rapidly and of equal quality, and render them less adapted for procreating healthy and vigorous animals.

The first and essential conditions necessary for producing healthy calves are—a liberal allowance of warm milk, shelter, and cleanliness. This is supposing that the calves are the progeny of healthy stock; the influence of the condition of the health in which both parents were at the period of contact, and particularly that of the dam during the period of gestation, being much more powerful than is at all commonly supposed. It is seldom that these conditions—a proper allowance of warm milk, with shelter and cleanliness—are all fulfilled. The number of calves reared frequently exceeds the available supply of milk; and other substances are resorted to, before the digestive organs of the animals are adapted for such food. From mistaken economy, skim-milk, whey, &c., are in many instances partially substituted; and too rapid changes in food and shelter are made. The calves, when weaned, are generally turned out from a warm house to an open field. The exercise and lower temperature make an increased demand upon the system, while the supply of milk and the other substances which were substituted for milk are withheld. The animal is thus physically weakened; and with cold, wet nights, are often laid the seeds of incipient disease. When the land is undrained, the temperature of the soil is necessarily lower than of drained lands, and the herbage generally less nutritive. Consequently, the shock to the constitution is greater; and it is on such lands that black-leg is almost an invariable yearly visitant, unless great care is taken in management.

Perhaps most of our readers may recollect the cold and wetness which characterised the months of June and July, with the drought which followed during harvest: if so, they will see the connection subsisting between the hardships then undergone by calves exposed in open fields, and the more general appearance of black-leg this winter. The cold and wetness of June and July, the stunted pastures during autumn, and the diminished supply of milk, &c., from the increased number of calves reared—these, singly or combined, must have seriously injured the constitution of all young animals exposed to them, either ultimately resulting in disease, or militating against after-progress.

That black-leg does not appear for some time after the conditions which superinduce it, is one of the causes of the belief that it is owing to high feeding.

The change from a low diet to one which furnishes more of the elements of nutrition, doubtless, disturbs the state of equilibrium to which the animal has been reduced. Thus the febrile tendency is increased; and in any part of the system in which the circulation becomes languid, the disease termed black-leg, or quarter-ill, or black-spall is manifested. The usual seat of the disease is one of the quarters; it occasionally appears, however, over the loins or in the brisket. The disease is generally first observed by the animal becoming suddenly stiff and lame, accompanied by depression. The eye is more or less expressive of pain. As the disease progresses, if the part affected is pressed by the hand, the skin gives off a crackling noise. After a few hours, the animal generally dies. Relief is sometimes afforded by blood-letting and physic; but the inflammation is usually so intense that no remedial treatment has time to operate before nature succumbs to the disease. If the animal is examined after death, that part affected will show a bright or deep red colour, the deepness of the colouring showing the extent to which the disease has progressed, and destroyed the parts. This red colouring arises from the effusion of the red corpuscles of the blood, which effusion commences by the walls of one or more of the small blood-vessels giving way, and a pouring of the blood into the cellular system. This blood not being returned again to the blood-vessels, active inflammation is set up, and the parts are speedily destroyed. If the effusion of blood were confined to a small spot, and not in contact with any of the large blood-vessels or nerves, absorption or sloughing would relieve the animal; but the effusion is usually so extensive that the whole quarter attacked is more or less affected. A similar result follows when the seat of disease is in the loins or brisket, the whole part being affected. The last animal which came under our observation, which had died of this disease, had the whole brisket red and discoloured. A seton having been inserted in the dewlap some days previously, influenced probably the cause of the development of the disease in the brisket. As setons were inserted in the calves to prevent further losses, several of them having previously died of black-leg, this result should induce caution in applying such a remedy. We repeat what we stated in a recent number—that oil-cake is the best preventive, and setons and bleeding, in our opinion, very questionable treatment, whether for prevention or cure.

It will be apparent that this effusion of blood is caused mainly by the walls of the cells of the blood vessels giving way, from the increased quantity and quality of blood produced by the improved feeding. The commonly observed connection, therefore, between high-feeding and black-leg is obvious; but had not the first predisposing causes —insufficient nutriment, absence of warm shelter, &c.—been operating by weakening the vital energies, even with the increased quantity and quality of the blood and the excitement of the system consequent on this increased supply of flesh and bone-producing elements, the disease would not have been produced. The great advantage, therefore, of attention to warm shelter and to diet is self-evident for the prevention of this and similar diseases. It is generally known to breeders of shorthorns that it is only by unremitting care from the first day of the calves' existence, up till the period of exhibition, that first-prize animals can be produced, and that a course of regular feeding, with attention to shelter, is essential for the maturing of healthy animals, and in high perfection.

Those animals which once receive so severe a check as to remove by absorption the soft cellular covering beneath the skin, and the fatty deposits which interline most of the muscles, can never be again brought out in full bloom. The same has reference to preparing cattle for the shambles. This fatty cellular tissue once partially absorbed, no after-feeding will produce a plump animal.

But, returning to feeding with shelter as a prevention of disease, were shorthorned breeders as unfortunate as the breeders of ordinary half-bred cattle usually are, the number of those who follow the breeding of shorthorns as a source of profit would be greatly curtailed. The comparative immunity of shorthorns from black-leg is principally owing to the care generally taken of them, especially during the first year of their existence, and not, as has been supposed by some, to the greater amount of physical energy. Their capacity of early maturity and size has been essentially produced, increased, and propagated by good keeping from birth, and the absence of hard fare; and this through a line of ancestry. Reverses always tell on the animal kingdom; and when these are continued through a course of generations, they stunt the form, and delay the period of maturity.

Calves cannot be made highly profitable without plenty of nutritive food, somewhat varied, with dry and warm lodging. It is always difficult to raise an animal, particularly a growing one, out of a low condition; and this is always done at an increased expenditure of food. As a rule, therefore, no more calves should be reared than can be well *milked*, and for which there is sufficient shelter.

The after-feeding should be somewhat varied during and after weaning. Clover, tares, with a small allowance of linseed-cake, or a jelly composed of meal finely ground with linseed or linseed-cake, should be given. A well-sheltered paddock, with liberty of a shed to retire to during the night, in which they may be shut up till the dew is off the grass, should be provided; the calves receiving the cut food in hecks arranged around the inclosure; or, in the absence of such in the fields, they may be removed to the steading, or kept wholly in the curtains. We have seen excellent shorthorns and half-bred cattle so reared, never being depastured, but always soiled. The winter keep should be composed partially of straw, with a moderate allowance of white or yellow turnip. If swedes are given, they should be grated down, and partially mixed with other food. The quantity of cake need not exceed 2lbs. daily, rape and linseed-cakes in equal proportions.

Cake is, of all feeding stuffs, the best adapted for the constitution of calves, and in the southern counties of Scotland is regarded as a certain specific against black-leg. This appears to be owing partly to the elements of nutrition it contains; but the beneficial effect upon the digestive organs appears no less to be a cause.

The change from green to winter food should be gradual; as also in spring, from winter to green food. The most common mistake is to allow calves to remain too late in autumn in pasture fields. Starved with cold and insufficient food, the animals are removed to courts, and kindness is expected to remedy neglect. Black-leg appears; one or two suddenly drop off; bleeding, medicine, and starvation are expected to save the survivors; and these specifics are rigorously followed out, with only very partial success, while generous treatment from birth would have prevented all this annoyance and loss.

We have not alluded to black-leg when appearing in animals six-quarters and upwards. The same causes are generally in operation; and in feeding districts black-leg is seldom met with, except the stock are from Ireland. Black-leg in Irish cattle is a very frequent complaint. The hardships to which the cattle are exposed from the general absence of housing, and such a moist climate, is an almost certain preparation for the development of the disease when they are removed to this country; and, consequently, to high feeding. We observe, from the *Irish Farmers' Gazette*, that great losses are being at present sustained in Ireland from this disease. Doubtless, the same causes which tended to its development in this country have also operated there.

Space does not allow of any allusion to pleuro-pneumonia in calves. This disease is confined principally to cattle above the age of one year, although it occasionally does appear among calves generally as an accompaniment of black-leg; and no doubt traceable to the same causes.

This season, so far as we have been able to estimate, the proportion of calves reared last summer will be diminished by something like 15 to 20 per cent. by black-leg. In some instances we learn that the half of the entire number reared are already dead, in another instance or two about one-third: while in most farms where cake has been allowed the calves from the period they were housed for winter, we have not heard of a single instance of this disease. Individually, and nationally, it therefore becomes important that breeders should study more thoroughly the principles which regulate animal life; an attention to which will secure an almost entire immunity from those diseases, such as black-leg, produced by ignorance and neglect. —North British Agriculturist.

GUANO.—The guano trade has become of great and growing importance to the agriculturists of Great Britain, and in Scotland, at least, this valuable manure has proved a full equivalent to the occupiers of the soil for the loss of protection. In this view we are supported by the practical experience of Mr. Hope, Fenton Barnes, a leading farmer in East Lothian, who, in concluding an article on experiments with guano, which appeared in the "Transactions of the Highland and Agricultural Society of Scotland," says—"Indeed it is to the invaluable aid of guano that the farmers of the United Kingdom are mainly indebted for having been successfully carried through a transition state of doubt and difficulty, the approach of which few regarded without alarm, as it was not unfelt even by those who had strongly advocated the propriety of the change." The prosperity which the farmers have lately enjoyed in this country as well as on the continent—the large consumption of guano in the Mauritius, the West Indies, and the United States, will all tend to increase the demand for this valuable manure, which has now become a great staple commodity, and gives employment to over 200,000 tons of British shipping annually. The sunless lands of Great Britain, the rice fields of Italy, the vine lands of Germany, the exhausted coffee plantations of Brazil, and the arid plains of Peru, all testify to its fertilising properties. In 1851, 6550 tons of guano were supplied to farmers from Leith; in 1852, 8000 tons; in 1853, 13,500—showing an increase in the consumption there, as compared with 1851, of fully 100 per cent. Last year, we believe nearly 50 per cent increase was shown. In the Clyde, in December, there was a stock of nearly 4000 tons ready for Spring orders. It thus becomes a matter of first importance to the agricultural community at large, that sufficient supplies of guano be directed to our shores, at or under the current prices of the last few years; and although there is a general outcry in Liverpool, and some other quarters, against the monopoly in Peruvian guano, we have reason to believe that the farmers of the Lothians, and Scotland generally, are satisfied with the mode in which the business is at present conducted. The chief sources of supply recently have been, besides the Peruvian, from Callao and the Chinchas direct, Bolivia, Cobeg, Port Desire, Sea Bear Bay, and other ports of Patagonia, Monte Video, Port Elizabeth, Latham Island, and Chili. The few small cargoes received from Chili and Patagonia have been eagerly purchased at high prices as compared with former years, and we learn that if supplies could be got of a similar description, they would yield a handsome return to importers. It is true they are less rich in ammonia than the Peruvian guano, but they contain large quantities of the next most important ingredient, phosphate of lime.—Shipping Gazette.

KENNINGTON AGRICULTURAL AND CHEMICAL COLLEGE.

LECTURES ON THE GENERAL PHENOMENA OF THE EARTH, HAVING REFERENCE TO THE PRODUCTION AND MAINTENANCE OF ORGANIC LIFE.

By Charles Johnson, Esq., Professor of Botany, Guy's Hospital.

LECTURE II.

In our first lecture we have only looked upon our earth as a globular mass of matter in a state of rest, indicating in the disposition of the various parts of its surface the action of causes productive of change, and the probability that such change has been going forward from a period of incalculable distance, and is still progressing. Before commencing the demonstration of some of the important results accruing to ourselves from this continued, though in many instances apparently slow, modification of the things around us, it will be necessary to glance at certain facts that, though well known and generally understood from those points of view whence we are most accustomed to regard them, are apt to be overlooked in the less evident but no less certain and undeviating phenomena by which they are accompanied. Such are, among many others, the motions to which our planet is subjected, and more especially that upon its axis, the source of day and night. This movement occupying twenty-four hours, and the circumference of the globe being computed to be twenty-four thousand miles, a person standing on the equator is carried round by it at the rate of a thousand miles per hour—a velocity, however, that of course becomes less and less as we approach the axis of revolution. Thus the motion on or near the smaller circles of the tropics is only seven hundred and fifty miles, and about the polar circles only two hundred and fifty miles per hour, while at the poles themselves it is ideally wanting altogether. From this diurnal movement, as it is called, has originated a remarkable modification of the earth's figure. The scattering of drops of water from a revolving mop or carriage wheel, and the casting of a stone from a sling, are instances of what is termed *centrifugal force*—a mere modification of that mechanical law in accordance with which every moving body manifests a tendency to fly from the source of motion. The action of this force, upon a fluid or flexible sphere moving on its axis, tends to expand those parts that are farthest from the centre of motion, in a greater degree than those nearer to it, and, of course, the mass being held together by the natural attraction of its particles, to depress those in its immediate vicinity; and this expansion and depression will be in proportion to the velocity of the motion compared with the density of the mass upon which it acts. Were the former to be increased while the latter remained the same, it might reduce the sphere to a plane, or, under a greater disproportion, scatter its atoms into space indefinitely. Observation has proved that our earth has been thus acted upon—that it is not a perfect sphere, but an oblate spheroid—that is, depressed at the poles and proportionately bulged at the equator: the inequality is comparatively small, the difference between its polar and equatorial diameter being only about twenty-six miles, or rather less than 1-305th part of the entire 8,000 miles; but it is worthy of notice here, as bearing farther evidence to the original soft, yielding, or perhaps melted condition alluded to in our previous lecture. The operation of the centrifugal force is manifested to a far greater extent on other planets of our solar system than it is on our own. Jupiter is nearly 1,300 and Saturn 995 times larger than the Earth, and their diurnal rotation is completed within a much shorter period, the day being only about ten hours instead of twenty-four. The relative density of these planets being as that of water and cork, this more rapid motion, acting on lighter substance, has depressed them so much at the poles, that the difference is very evident through a telescope, amounting in Jupiter to 1-12th, and in Saturn to 1-11th of their respective diameters. The depression, in all instances, depending upon invariable mechanical principles, has attained its maximum, and no longer increases as regards the general masses of the planets; but the natural law under which it took place still operates upon our atmosphere and ocean, and thus becomes an essential object of our notice.

The great extent of the ocean, compared with that of the land, and the irregularity of its distribution in the two hemispheres, as well as in minor details, are circumstances intimately associated with the existence of organic being under all its forms, whether of vegetables or animals: the proximate element thus widely spread out, so as to occupy three-fourths of the whole superficies of the globe, constitutes an indispensable portion of their substance, and is the grand medium through which all the important functions of vitality are maintained, without which they must cease. The supply of water to the organic frame is not limited to that conveyed to the stomach of the animal or to the root of the plant; the whole surface of the living body is an absorbing one, and ready at all times to drink in from the surrounding atmosphere that atomic moisture which is always more or less distributed throughout its substance. Were the ocean, the grand reservoir of this important medium, to present a motionless surface, like that of a small lake or pool, its unequal distribution would still be productive of considerable influence upon the land, not only in the immediate vicinity of its shores, but even in the interior of the large continents to indefinite distance, in consequence of continued evaporation, and the difference in the radiation of the sun's heat between the fluid and the solid surface; but, subjected as it is to various causes of disturbance, acting in different directions, and not only superficially, but agitating the whole mass of its waters to unknown depths, its effects upon all organic nature are so manifold as to be scarcely appreciable in their full extent under our present imperfect acquaintance with physical phenomena. We know enough, however, to be convinced of their vast importance—to be, indeed, aware how much the varied aspect of different countries lying under the same parallels of latitude is due to their relative position with respect to the vast and irregular basin of the great deep, their greater or less distance from its shores, or their elevation above its waters.

The insular character of the two great continents is in some degree negatived by the near approximation of their northern extremities, especially where the extreme eastern limit of Asia is separated from the western part of North America by Behring's Straits, a channel of only fifty miles in breadth; and, although more widely distant on the opposite side, they may still be regarded as inclosing an almost circular area of considerable extent, about the North Pole, from the main body of water, the Frozen or Arctic Ocean. The extension of the continents toward the south divides the remaining and vaster portion, through the greater part of its length, into two very unequal sections, the Atlantic and the Pacific oceans; commingling on the one side through the island-studded channel of the Indian, and on the other mutually losing their respective titles in the Antarctic Ocean. Independent of these grand divisions of the main basin, whose limits are more or less arbitrary or conventional, and whose borders are variously, but indefinitely, subdivided into seas and gulfs and bays, named, for convenience' sake, after the countries or districts to which they are adjacent, there are several smaller basins, that, in consequence of their being almost completely enclosed by the land, are styled inland seas. The most considerable of these is the Mediterranean, with a length of 2,000 miles from Gibraltar to the coast of Syria, and covering an irregular surface of 784,000 square miles, without including the Black Sea, the extent of which is 180,000 square miles. The Baltic Sea, the most remarkable feature of the north of Europe, is of comparatively small extent, its surface being 20,000 square miles less than that of the Black Sea. The Red Sea, or Arabian Gulf, is nearly equal to the Black Sea. Although these smaller masses of water are as mere specks compared with the vast extent of the ocean in its aggregate amount, their position, intersecting a large portion of the great eastern continent, has a very considerable influence upon the climate and natural productions of the surrounding countries, and it extends the oceanic agency to limits that materially affect the whole; a circumstance that will hereafter require more especial notice.

Before we enter into a detail of the more immediate influences of this vast and ever-moving body of water, it will be necessary to advert to some of those peculiar conditions by which it is distinguished from the purer forms of that fluid which fulfils so many valuable offices in our own economy. The solvent property of water in regard to many substances is well known and generally understood, but the contrary is the case in regard to others; hence the ordinary and familiar division of solid bodies into soluble and insoluble; a division, however, of very arbitrary character, as the limits of solubility are so uncertain that, irrespective of quantity varying from high to infinitesimal proportions, while the point of saturation is in certain instances rapidly attained, the process in others is slow and indefinitely prolonged.

The ocean water, resting in contact with, perhaps, every existing mineral substance more or less distributed in the vast and irregular basin that contains it, has thus become a highly compound fluid, mechanically and chemically combined with elements proximate and ultimate, to a degree unequalled in any other; and it may be regarded as the probable recipient of every soluble material that the earth contains. It is not necessary here to enumerate all of the substances which in varied proportion have been obtained from it by analysis; the principal are:—

Chloride of sodium	Sulphate of magnesia	Traces of bromides, iodides, and fluorides.
Do. magnesium	Do. lime	
Do. potassium	Carbonate of lime	

The proverbial saltness differs, as do likewise the proportions of these and other compounds, in different parts, and especially in inland seas, where the waters are but slowly commingled with those of the entire mass, and at the same time other circumstances combine in producing a variation. The average quantity of salts contained in the water of the main ocean is about .035; that is, of every 1,000lbs. of sea-water 35lbs. consist of these soluble salts, of which the chloride of sodium is the principal, being .027. In the Mediterranean, which receives few rivers compared with its great extent, and which lying under a warm latitude loses a great amount of water daily by evaporation, the salt is considerably above the average, being .042; while in the Baltic, into which numerous rivers flow, the salt is only .012, rendering that sea so comparatively fresh as to freeze readily on the setting in of the winter in the cold region it occupies. The saltness of the sea-water is of great value in several points of view, more especially in contributing to preserve its healthy condition, and in preventing it from freezing, unless under the influence of the extreme cold of the polar regions. Being constantly in motion, the water of the main ocean is always of a higher temperature than the atmosphere above it during the prevalence of frost, partly on account of its slow conducting power as regards the passage of heat, partly in consequence of the continued mingling of the warmer with the colder; and some very wonderful provisions have been ordained in order to render freezing a slow process, and at the same time confine the effect to the surface. Thus, fresh water is converted into ice at a degree of cold numbered on our thermometers 82, and called the *freezing point;* but sea-water must be cooled to 28 degrees before it freezes; and then, as the ice contains no salt, the water below it becomes salter and salter as the ice thickens, and consequently requires a still greater degree of cold to produce its consolidation. Again, it is a general property of matter to become expanded by heat, and to contract and acquire greater density on being cooled; and water is subject to the same natural law, until it is cooled to about the temperature of 40, or 8 degrees above the freezing point: then it begins to expand or take up more space, as it becomes further cooled into ice, which is thus rendered so much lighter than water as to float upon the surface. Had it been otherwise, had the ice in forming acquired greater density, occasioning it to sink to the bottom instead of floating, the sea in the colder regions must have become a mass of ice throughout its whole depth, perhaps slightly thawed upon the surface during the summer day, but freezing again at sunset, and thus have rendered a large proportion of our present continents uninhabitable.

Of the bottom of the ocean we know very little positively, except that it is very irregular; in some parts shallow; in others, so deep that it has not been reached by a line of five miles and a-half in length. Its greatest depth has been estimated at nine miles and a-half; but the calculations are open to question, and at present rest upon very equivocal evidence. The shallow parts may be considered as representing the mountains and high lands of the earth, and where the tops of the submarine mountain reach above the surface of the water, they form islands.

These circumstances, that at the first glance may appear altogether irrelevant to the subject before us, are all more or less connected with terrestrial production; as they influence most materially the climatic conditions of different countries, upon which the character of that production is either altogether dependent, or by which it is liable to be modified; and though the gradations of effect are often so delicately marked as to be traced with difficulty, it is no less necessary that they should be borne in mind as among the probable agencies by which many of our calculations are at times rendered futile. Indeed, so closely interwoven are all of the phenomena around us, that, without duly considering these possible liabilities, we cannot expect to avoid the repetition of failure or to improve by experience. The different density of sea-water on any particular line of coast, arising as it does from the greater or smaller quantity of soluble matter it contains, reacts upon the atmosphere, through the medium of conduction and radiation of the solar light and heat; and the depth or shallowness of its bed is no less concerned in the production of many of those contingencies that we often find difficult to reconcile with our preconceived notions of parallel cause and effect; and as, under the hand of the artist, the substitution of the slightest shade of colour may mar or improve his picture, so may the shifting of a sand-bank in the German ocean, or the rise of a coral reef above the waves of the broad Pacific, contribute to change the entire character of the surrounding region, and produce effects only to be appreciated by a close investigation of results, dependent, after all, upon the most ordinary operation of the laws of matter.

In every age, inquiring man, unable to comprehend in their full extent the details of Nature's government, has sought the existence of a principle superior to matter; and noticing how much of the grand mechanism of the universe, even of that portion immediately around him, is worked by powers that baffle the keenest of mortal senses to discover them, how much of those phenomena upon which he most prides himself on having the best explained and understood is really the result of invisible and impalpable agency, the success that has rewarded his diligence in research, in bringing to light and to the test of experiment a medium so subtle as electricity or magnetism, is no more than might have been expected; though elated by the discovery of a few isolated facts respecting it terrestrial magnetism has so much occupied attention of late years, as to lead or tend to lead the mind astray from those material influences associated with its manifestations, and among these the phenomena of the ocean are the most extended in their action.

The continuous and reiterated movements observable in this vast body of water are chiefly referrible to the well-known periodical rise and fall of the tides, the action of the winds, and the various streams or *currents* that, independent of both run like rivers in different directions over the surface, and at the same time influence the general mass to indefinite depths: all of these disturbing causes are more or less dependent upon the earth's motion on its axis. The tides are explained as the result of the joint attraction of the sun and moon, more especially of the latter, raising the water in the form of an immense hill or wave on that side of the surface exposed to its influence, which wave, were there no land, would move uninterruptedly round the globe, as by its diurnal rotation the different parts of the surface passed in succession beneath our attendant planet. The extension of the two great continents, the numerous islands and shallows of the central Pacific ocean, and other circumstances unnecessary to be detailed, contribute to prevent this tidal movement from proceeding with its full effect on those parts of the earth where the attractive force is most powerful—namely, on the equatorial or middle portion. For illustration sake, the tide then may be considered to commence in that uninterrupted portion of water around the south pole, as, for instance, in the Pacific, to the south-east of Australia: the wave there raised, moves in a north-westerly direction, flowing first into the Indian ocean; thence, resisted by the continent of Africa, it passes round the Cape of Good Hope, and, following the same direction, flows up the Atlantic, reaching the mouth of the Thames about two days after it has left the shores of Van Diemen's Land. The wide and deep opening of the Atlantic, unincumbered with islands, admits a free passage of the tidal wave towards the equator, and as wave succeeds wave, the moving influence is extended northward even to the verge of the Arctic seas in our part of the globe; but it is otherwise in the broader basin of the Pacific, in many parts of which the tides are scarcely capable of being traced, in consequence of the obstacles presented to their progress by the irregularity of its bottom, which being greatly elevated over the whole central part, where it is studded with innumerable islands, forms an almost positive barrier to their influx; this will be readily understood, if we recollect that what has been spoken of as the tidal wave is not a mere surface movement, but one that influences the mass of water to its lowest depths, and hence liable to be checked by every rise that occurs in the foundation over which it moves.

The effect produced on the climate of Western Europe by this successional motion of the water from the south, across the equatorial part of the Atlantic, is doubtless considerable, on account of its tendency to commingle the warmer with the colder fluid; but a more important modification is maintained by an action that in its source is immediately opposed to that of the tides, though eventually resulting in a movement in a corresponding direction: this is the remarkable current called by our navigators the Gulf-stream, a phenomenon dependent upon the operation of the centrifugal force generated by the diurnal rotation, the same mechanical agent under which our globe has become flattened towards the poles. The water of the Arctic Ocean is by this force caused to flow towards the equator; and as there is only one broad channel through which it can pass, the two great continents almost completely investing it in every other direction, it becomes converted into a powerful current, flowing southward into the northern part of the Atlantic, between Greenland and Norway, denominated the Arctic current. Being thus carried successively from a part of the globe in comparatively slow motion to one moving more and more rapidly in a larger circle, the water does not acquire immediately the increased rate of motion to which it is thus subjected during its course southward, and is, as it were, left behind: so that by the time it reaches the equator, where it is opposed by a corresponding flow from the Antarctic seas, it assumes the form of a current, rushing from the shores of Africa towards the continent of South America, in a direction nearly parallel with the equator; then turning northward, it pursues a course through the Caribbean Sea, and, rounding the Gulf of Mexico, passes through the Straits of Florida and along the shores of the United States until it meets the great polar current about the island of Newfoundland. Here the confluence of the two seems to have occasioned the vast accumulation of solid matter forming the bank so celebrated for the cod-fishery, a natural result of the comparative stillness of the opposing streams where their forces neutralize each other. Resisted, but still serving as a barrier against the too rapid flow of the Arctic waters southward, it is turned to the east and south-east, and at length, overcome by them, returns with them towards the equator; not unfrequently, in its passage, casting the animal and vegetable productions of the West Indies upon the Azores and the western shores of Africa. It has been estimated that the course of this current from the Straits of Florida to the Azores is upwards of 3,000 miles, a distance which its waters traverse in about seventy-seven days.

The Mexican, or Central American Sea, has been compared to a vast cauldron, from which the water, heated by long exposure to a tropical sun, is carried by the Gulf-stream to form a wide expanse of warm surface in the centre of the North Atlantic, more than equalling the Mediterranean Sea in extent. The temperature of the water is at the least from 8 to 10 degrees above that of the ocean itself in those latitudes, and might therefore be supposed to contribute greatly to the mildness of climate by which Western Europe is so strikingly distinguished from other lands lying under the same parallels. But although the northward flow of the current is overpowered, and prevented from attaining a higher latitude than Newfoundland, the greater weight of the cold water opposing it occasions the warm to flow over, and thus to be borne upon the surface to a far greater distance; reaching even the coast of Norway, and leaving upon it the floating sugar-cane, the bottle-gourd, and the cactus, wafted perhaps from that of Cuba, or even of the more distant Trinidad; and at the same time maintaining that remarkable exemption from excess of cold in those parts, that leaves the island-straits, inlets, and fiords of Scandinavia open to navigation throughout the winter, even within the arctic circle.

Independent of the local effects already mentioned resulting from these grand movements, the continued mingling of the water from different parts of the ocean renders its temperature much more equable than that of the atmosphere. In cold climates, especially, it is warmer than the air in winter; and hence the climate of the sea-coast is generally milder in these latitudes than it is inland, and islands are more temperate than continents—a fact evinced by comparison of our own winters with those of the neighbouring lands of Europe.

I have dwelt thus long upon the general phenomena of the ocean, on account of the great and important office assigned to it in the economy of the earth as a habitation for man and the series of organic beings that minister more or less essentially to his existence. Its vast extent, the composition of its waters, their varied movements and disturbances, are all so intimately connected with the subject before us, and so strikingly in unison with the circumstances dependent upon them, that we cannot regard it otherwise than a principal agent in the government of the Creator.

AGRICULTURAL POSSIBILITIES.

No. II.

STEAM CULTURE AS APPLIED TO ORDINARY FARM IMPLEMENTS.

> "The willing Giant stands idly panting and smoking."
> C. W. H.

I am aware that I have undertaken a somewhat Utopian task in endeavouring to show the advantage of applying steam to our present appliances for purposes of culture; nor do I indulge any great hope of making much of it. My great aim, however, is to show its practicability to a great extent as applied to implements already in common use at this time, and at a future day to carry the subject to new appliances which have yet to be invented, and to that partial revolution in agricultural practice which must ultimately follow.

That the effective power of *the steam engine* is capable of being applied to purposes of culture I need not stay to prove; whether its best mode of application is as a fixture or a locomotive admits of question. My own opinion is decidedly in favour of a locomotive; but to be used in almost all cases of field culture as a fixture, and performing its work with wire-rope or chain, by means of moveable anchorages. The performance of work by a locomotive used as such would involve several almost insurmountable difficulties; the great weight of the engine would unduly press and solidify the land at all times, and in wet seasons it could not work at all. The direction and general management required in progress, in turning and the like, would prove most serious obstacles, dragging after it, as it must do, the various implements which from time to time may be attached to it; but place it at a corner, or at the end of a field or plot to be cultivated, supplied with its endless chain or wire-rope and anchorages, and all is of easy adjustment and ready application.

Mr. Fowler, of Bristol, demonstrated this mode of draught most satisfactorily at the Lincoln meeting of the Royal Agricultural Society of England. He there exhibited, in work, a most powerful and effective machine for putting into the soil draining pipes at any required depth not exceeding six feet. The machine was drawn by one of Clayton and Shuttleworth's six-horse-power engines, and the pipes were then laid with the greatest order and regularity, at a depth of four-and-a-half feet, and at the rate of forty-two yards in six minutes. The engine (a portable one) was fixed near the side of an elevated part of a large sloping field, the machine in the valley. Attached to the machine was a strong copper wire-rope of great length for the draught forward, and a smaller one to draw it backward, when out of work, to the bottom of the field, there to recommence its regular work forward. We were there told by the exhibitor that the multiplication of power by crane-gear on the engine was so great, that in the valley below he was working, or could work, with a draft of 180-horse power; and, subsequently, that he could work a cultivator, or other implement requiring the power of thirty-six horses, at a speed of 100 feet per minute, by the same appliances: these implements to be regulated by anchorages, as named above. The anchorages consist of two large and powerful wheels lying close to the ground, around which the wire-rope is drawn—in fact, they are common pullies fastened to the ground. These are placed at each end of the field or work in progress, and altered to meet the next breadth continually as the work proceeds; so that if the breadth completed is six feet each bout, the anchorages are adjusted to six-feet breadths, and so on successfully by mathematical rule throughout the field, according to the breadth required. Here, then, we have a satisfactory mode of draught, and that line of draught well regulated by powerful anchorages; these anchorages working by a strong pulley capable of sustaining any reasonable strain that can be brought to bear upon them.

Let us see, then, how this power can be advantageously applied to the ordinary farm implements of the present time. I shall assume that every farmer, occupying to the extent of 200 to 300 acres, is possessed of a steam engine of six-horse power. With this he thrashes his corn, cuts his chaff, breaks his cake, grinds his pulse or corn, &c. This he does now and then, and all further operations by aid of steam are ended. This I think is wrong: the engine is costly, and ought not to be idle. I believe it to be within the scope of an "agricultural possibility" to make it available for nearly all purposes of draught: it certainly can be applied to works of drainage, either on surface or in subsoil work. What insurmountable obstacle is there to prevent its application to the draught of ploughs, harrows, scarifiers, field-rollers, drills, and reaping machines? or, again, of waggons or carts? All these may be so adjusted, by various contrivances of no very ingenious or expensive character, as to work with regularity and facility. The plough would perhaps require wheels, or it may be a gallows; harrows of all kinds merely require dragging; scarifiers of every class can easily be regulated by a front wheel extra; rollers, drills, carts, waggons, by a front wheel and steerage: as to whippletrees, their adjustment, and other minor matters, these would soon be rectified, and put in proper order for such work.

The advocates for steam culture, or of the various appliances of steam, always appear to me to expect too much. It is only a substitution of mechanical power for horse or animal power—nothing more. The question is, as to which ultimately will prove cheapest and best. Horses consume much food, and tire in their work: the engine consumes much coal certainly, but does not tire; consequently, in the day's work it will effect more than can be done with horses, but the cost in wear and tear perhaps may be considered about equal. That some horses must be kept on a farm is quite certain, but their employment should for the most part be in carriage-work; leading corn to market, and the like, and the many minor operations of the farm. The bulk of the work —the hard work—should be done by aid of steam; and this it is possible to do, even with our present stock of very imperfect implements for such kind of culture. To prove this, we will take, for instance, a field to be sown with wheat. We place our engine in a favourable place, corresponding with the form and extent of the field to be sown, and the length of chain or rope we have to give out. Our anchorages are fixed at each end of our work: three or four ploughs are provided of like form and inclination of mould turner, supplied with requisite wheels to regulate depth and give steadiness in work: these are attached by a clasp to the wire rope extending from the engine to the anchorages, and thence by suitable whippletrees. A ploughman holds each plough, and has a line in his hand reaching to the clasp. In case of obstruction to any plough, the workman pulls his line, the clasp relaxes, and the ploughs are stationary, and the engine is stopped by its "governor" shutting off the steam. When the obstruction is removed, the rope is brought back, the clasp again grasps it, and the ploughing proceeds. The same course is to be pursued with the harrow and drill; and attached to the axle of the drill may be the seed harrows, to complete the whole process of wheat-sowing at one operation. I give this one instance, and leave my readers to exercise their imagination as to all the other various operations to be performed: this one instance will, I think, show the possibility of the rest. I hope in my next to show that although it is possible—it may be barely possible—to adopt cultivation by steam with our present appliances, yet with an improved practice and proper implements it will become the great feature in modern agriculture, and meet with universal approval.

No. III.

STEAM CULTURE.

IMPLEMENTS TO BE ADOPTED.

I have no hesitation in asserting that the gigantic power of steam is destined to revolutionize the practice of agriculture quite as much as it has done any of the various departments of business or other operations to which it has been applied. We know that steam culture cannot be carried out with the greatest advantage by our present class of implements, any more than spinning could be advantageously done by applying steam to the distaff or spinning-wheel. No: new machinery had to be invented, better adapted to its powers; and so, in agriculture, new orders of implements and new modes of culture must be introduced as more applicable to the genius of steam, if I may so state it.

All cultivation or farm practice is now based upon the performance of the plough, and much ingenuity has been expended in bringing that implement to its present almost perfect state; but, superlatively good as it is for the purposes to which it is used, yet it must be borne in mind that it only performs one operation—inverting the soil—and that not fully. It does not cultivate, it does not pulverize; it must be followed by the harrow, the scarifier, the roller, to effect this. We want cultivation, pulverization, comminution, the subdivision and breaking down of the soil; the plough is only the forerunner of more suitable implements for this purpose, and causes a great amount and expenditure of animal labour which it is possible to save, or, at all events, greatly to economise. The spade is often taken as the model of a good implement for turning up or inverting the soil. It undoubtedly is very good in its place, worked by a skilful hand; but then what various chopping, and beating, and crushing management is required to bring it into a sufficiently comminuted state to receive the seed! We want an implement of a powerful character to combine and effectually execute these various operations at one and the same time; I mean a machine to break up, subdivide, and comminute the soil for any given purpose by one operation. I say for any given purpose: by this I mean that its powers of adaptation shall be such that, by various alterations in the machinery, or the substitution of parts, it shall be made capable of cultivating the soil for any required purpose. Is it for wheat? Then its appliances must be arranged for leaving the soil in a somewhat chequery or not closely pulverized state. Is it for turnips? Then its arrangement must be for finely pulverizing. Or is it for open fallows or trench-work? Then it must be arranged for turning up the soil and leaving it in large pieces, according to the nature of the soil or the requirements of the farmer. Is this an *agricultural possibility?* I doubt not but our clever mechanists will soon satisfactorily solve that problem. The efforts of our inventive mechanists have been too much devoted to bringing out "steam ploughs"; but they prove, and will prove, very imperfect implements. See a steam-engine at work in a factory! Is it confined to one department of manufacture only? By no means—it works the whole. And so in field farming, if we adopt steam culture, it must be with the view of doing the whole work of digging or ploughing, of harrowing and scarifying, or, in other words, of breaking up, comminuting, and pulverizing the soil at one operation. Not that this is at all times required; as, in fallowing, the soil cannot be kept too open, for the purposes of aëration; but we require the capacity in an implement to do all this. We have seen forking machines, digging machines, revolving ploughs, and the like. These are inventions in the right direction, steam being more easily adapted to the working of cylindrical machines than to those of common traction; and machines thus armed for work can be made to work deeper and more effectively. They will dig or fork deeper than a common plough can work with the same application of power; and the rate of speed is not all-important. The combination or accumulation of power (as shown by Mr. Fowler, as already named) is of far greater moment, and may be turned to good account upon an implement of such power.

I have full confidence in our mechanists; I believe we shall soon see the very implement we require. The Royal Agricultural Society of England has offered a premium of £200 for such invention. I hope to see it in work at the Carlisle Meeting. Should, however, such a consummation be delayed, we might, I think, profitably go on with the implements we have; assured as I am that, sooner or later, this new order of things will prevail, and the *plough*, so long the foundation of British industry, will to a great degree be superseded by more powerful and more effective mechanical appliances for the proper cultivation of every kind of soil.

It may with great propriety be asked—But what courses of culture or cropping are we to pursue under this new regimen? It will certainly involve much and important discussion, and great alterations must unquestionably take place. This part of the subject I will endeavour to take up in my future papers. I shall attempt to show how these new appliances can be brought into general practice on every farm; I shall attempt to show that, with these improvements, open courses of culture and cropping must be conceded to the tenant, and what alterations in cropping or management may be right and beneficial. Ultimately it may lead to a great revolution in tenantcies, which may lead me to try and show the new duties of landlord, agent, and tenant.

These are, I am well aware, strange innovations for a practical farmer to introduce, if not to intrude upon the agricultural public. But we live in no ordinary times; progress—rapid, enlightened progress—is the universal aim in every department of business. We therefore must not, as farmers, lag behind, nor must we fall in with every supposed onward movement; but it is imperatively our duty to keep our attention up, and watch anxiously the dawn of any real light that may enlighten our path, or tend to advance our position in the wonderful era in which it is our great privilege to live.

P. F.

ON THE BENEFICIAL INFLUENCE OF COMMON SALT UPON THE ANIMAL SYSTEM.

Dear Sir,—In your paper for this week I find a letter from Mr. Forbes, of Windsor Forest, on the advantages of supplying sheep with salt, as a preservative from the foot-rot; but as your respected correspondent has not pointed out the *rationale* of the practice, and the manner in which it produces its beneficial effect, I will endeavour, with your kind permission, to supply the deficiency in his letter; and for the benefit of such of your readers as have not paid attention to the subject, point out the sovereign virtues of common salt (or muriate of soda), and the absolute necessity of its use, *by all animals*, for the preservation of health.

The outward application of salt to dead animal flesh for antiseptic purposes is too well known to require a single remark; but that the same qualities which render it so necessary in the preservation of dead meat has an equally beneficial effect upon the living animal, is not so generally understood. It is nevertheless a fact, that common salt prevents that tendency to putrescence of the nutritious portion of food in the stomach, which, when they are conveyed into the blood, produce fever, boils, sores, and a variety of other dangerous or troublesome disorders. Medical men, however, are well acquainted with the fact that the prevalence of these evils amongst the poor is, in a great measure, ascribable to their not using salt with their food; and that the offensive smell so frequently perceptible in the dwellings and near the persons of many of the poor arises from the same cause, much more than from their want of cleanliness. It is, in fact, impossible for a person or a family to sustain health long together without the free use of this *simple* and *cheap* condiment.

Salt acts upon the juices of the stomach as a corrective of that tendency to acidity which is the basis of putrescence, and, in a proper quantity, renders the blood healthy and active. It promotes insensible perspiration, by preserving the pores of the skin from being clogged up by those unctuous matters, which without it would be passed from the stomach into the system in an impure state. Any person who habitually eats his food, whether animal or vegetable, without salt, will soon find himself subject to diseases which (although he may ward them off by medicine) will not fail to return upon him from time to time, as long as he neglects it; nay, his *very breath* will betray that neglect. But they who constantly use salt, although not absolutely exempt from disease, has at least ten chances to one in favour of the preservation of their health.

The same principle is as applicable to the inferior animals as to man; for, in this respect, their constitutions are precisely similar. No stronger proof, in fact, of the worth of this assertion can be adduced than the eagerness with which all kinds of animals seek for it. Horses, horned cattle, sheep, and pigs will almost pull their keepers to pieces, if they find they have salt about them, in order to get at it; and all fare the better for it, from the same cause. The freedom of Mr. Forbes' flock from the foot-rot was undoubtedly produced by the antiseptic qualities of the salt, which by correcting the juices of the body, and purifying the blood, prevented that tendency to putrescence which in the three *rigs* settled in the feet; the *dampness of the meadow being the exciting cause*, which the salt would have neutralized.

I have reason to believe, too, that the use of salt would prove efficacious in preventing that fatal disease to which very fat sheep are liable when at turnips towards the spring, and which is equivalent to apoplexy in the human frame. I have sometimes seen three or four fat wethers in a flock of two or three hundred "drop" in a day. From perfect health, and whilst quietly feeding, they suddenly fell, and were dead before I could get up to them. This same disease arises from the grossness of the fluids, and especially the blood, produced by the same tendency to putrescence which clogs the current and prevents the free flow of the juices so essential to health.

I would therefore recommend all your agricultural readers to supply with salt, not only their sheep, but every animal on their farms, and they will certainly find their account in it. The expense now is not worth a thought, when compared with the benefit they would derive from it. The best and cheapest mode of its application is by using the rock salt, a lump of which being put in the manger for horses, and trough for other animals (protected from the rain), and they will soon find it out. Their natural instinct tells them that it is beneficial to their health, and they will look for it as anxiously as for their food.

Perhaps it is one of the most remarkable illustrations of the principle I have been endeavouring to elucidate, that the vast accumulation of the fossil bones of those extinct animals—the mammoth, &c.—discovered in America, are found at a place called, in the quaint phraseology of that country, "*Big bonelick.*" It is, in fact, a salt spring, the subsoil of which is a clayey quagmire. And the probability, according to all human appearance, is, that these huge animals when resorting thither to partake of the salt, quarrelled about it, and in their struggles sunk and perished in the mud. I should add, that the discovery was made by observing the deer and other animals resorting thither to lick up the salt.

Yours truly,
An Old Norfolk Farmer.

London, 28*th Dec.*, 1854.

P.S.—If your correspondent "Enquirer" would supply his cattle freely with salt, he would find it beneficial in preventing, in a great measure, the "*Black quarter*," or, as it is called in Norfolk, "*Black water*."

THE PLOUGH: ITS USE AND VARIETIES.

Many persons who fully value the grubber or cultivator as an implement for following and completing the work of the plough, may not be aware that it does but perform upon our up-turned furrow-slices the same kind of operation which the ploughs in most parts of the world are able to do of themselves. The Eastern ploughs need no after-harrowing, rolling, and scuffling; but plough and pulverize at one and the same time. In China—famed for its first-class husbandry and minute culture—and in India, the ploughs are implements of small power; a man can easily carry one on his shoulder: and about Canton, on the clay soils (which are tenacious, and are always ploughed wet), only a single buffalo is needed to work one. "In India," says Beatson, "I have seen a man returning from his day-labour, seated on a small bullock, gaily trotting home with his two ploughs, one in each hand, resting upon his thighs." It is not by a single operation that these light tools perform the wonders which have attracted the notice of travellers; this would be utterly impossible, both for their strength and that of their miserable team: the whole secret consists in petty operations, incessantly continued. Sometimes, after six or eight ploughings, the plough will not have penetrated more than three inches deep, and has turned over no part of the soil. Rude as may be the implement, yet it, in time, scratches a sufficient staple into a fine state of division. It is to accomplish a similar mincing and crumbling, that our English cultivators have been formed; only for the sake of greater expedition our more skilful mechanicians have combined a number of separate tools in one frame, each tine or tooth thus representing one of the oriental ploughs. So pre-eminently useful were these implements found, that, as we have seen in a former article, they displaced the plough in many operations, and some farmers even endeavoured to employ them wholly instead of it. In 1776, Lord Kames advocated the system of sowing "spring" corn upon a winter furrow, by simply harrowing the surface which had been exposed to the action of frost and air, and become so finely mellowed that "it would be a pity to bury it by a second ploughing before sowing." The plan was successfully followed; but, when the grubber became established in the Lothians and other counties, it soon developed a general improvement. And in most of our English strong-land districts we find that the introduction of the scarifier or scuffler led farmers to consider how absurd it was to bury, by spring ploughing, the friable porous surface (obtained during the winter), upon which, if rain falls, no plastering ensues. Not only for spring cultivation, or for opening and moving fallows in summer, but also for autumn tillage the farmer has discovered the advantage of an implement that breaks and crumbles *without turning over*; and though the advocates for a less frequent use of the plough may be challenged as relying too much upon a novel system, still it has been demonstrated as a great improvement over and over again for many long years without having being extended in practice as it deserves. Arthur Young and Sir John Sinclair were thoroughly convinced, from multiplied examples in their day, that if one ploughing to the full depth was given once in twelve, eighteen, or twenty-four months, shallow tillage afterwards, by broad-sharing, scuffling, horse-hoeing, &c., was in many cases preferable to repeated deep-working, and especially for wheat, which loves a firm bottom. The Isle of Thanet shim and the Kentish broadshare, followed by harrows, were found to prepare bean stubble for wheat in an excellent manner. But, notwithstanding the balance of favourable evidence collected twenty or thirty years ago, the system still needs to be urged upon the English farmers' attention. One reason for this backwardness undoubtedly lies in *the great cleanliness requisite in the preceding crop*. The agriculturists of Flanders excel us in this point, and have taught us great lessons in tillage, as well as in the management of manures. Before we began to feel the value of grubbing, instead of continually ploughing, our neighbours made constant use of the *binot*. This implement—drawn by two horses, and going five or six inches in depth—does not turn over the land like a plough, burying the surface with its weeds, but elevates it into small ridges; by means of which the couch and other root-weeds are not only cut, but are exposed to the frost in winter, and to the drought of spring; and when the land becomes dry (which it quickly does when thus raised), these weeds are collected by the harrow, by a "trident," a rake, or by the hand, and are either burnt or mixed in a compost with hot lime. One turn with the binot is considered as effective as two ordinary ploughings; and with the same strength of team, it accomplishes more work in a day than a plough. Perhaps the chief advantage of all is that, by its frequent employment in breaking up and cleansing ground, the heaviest land is rendered in a great degree tender and friable, losing that hardness which all clay soils are apt to acquire after having been long cropped, without an occasional minute pulverization.

At last, when all these successful examples at home and abroad failed to arouse general imitation, the perfection and cheapness of the instruments which have been constructed to take the place of the plough are universally extending this kind of tillage amongst us. Paring-ploughs and scarifiers, cheap and uncommonly efficient, are being manufactured by numerous makers, and purchased by farmers throughout the length and breadth of the kingdom: which, we believe, have given an unparalleled impetus to the system of *tillage and cleaning without unnecessary inversion.* As an instance we may mention that an Essex farmer this last year has obtained seven quarters of wheat per acre, although the seed was put in without once ploughing. Manure for the preceding bean crop was deeply buried; the beans while growing were kept perfectly free from weeds, and the land after harvest was prepared by simple broadsharing and pulverization. Of course this cannot be done upon foul land; but with all the recent improvements in field implements, it will be a slovenly piece of parsimony not to keep our infesting couch and annual weeds within close bounds. If done judiciously as to crop and season, no expense is wasted in destroying them; and when weeding becomes a more important point of our husbandry than it now is, the amount of labour will not increase in so rapid a proportion as our watchfulness and care; for we have the example of clean farmers assuring us that being always carefully done, there is always the less to do.

THE DIFFERENCE IN FEEDING GOOD OR BAD STOCK.

Mr. Mechi, upon reading his last paper before the members of the Society of Arts, stated "that live stock are *necessary evils,* mere manufacturers of manure, and unattended with direct profit; and, in continuation, remarked, "that if you gave them cake and hay with the turnips and green crops, the return for such will be *nil,* and their cost must be charged to the corn crops against the manure."

In this opinion, Mr. Mechi states he is confirmed by Mr. Lawes, and others; and if we accept his statement as true, then it becomes the agriculturist to ascertain whether it would not be more economical to dispose of his produce, whenever it was practicable to do so, and to purchase portable and highly concentrated manures, rather than embark his capital in such a hazardous and unprofitable speculation as stall feeding-cattle.

Under such a system as Mr. Mechi, and many others, carry out their management of cattle, it may be so; and frequently, from the circumstance of the lean animal being purchased at too high a rate, and reduced too greatly in condition to be put at once upon forcing food—upon these two points the chief element of success depends; and it is otherwise highly important, that an animal for stall feeding should be well bred, of good touch, and frame. These are first considerations, and every grazier will understand what we mean; but how few have discrimination or opportunity sufficient to cary them out into practice!

The proportion of well-bred animals that reach the southern and eastern portions of the kingdom is small in comparison with those of inferior quality; and these are generally sold in large numbers, beyond the requirement of middle-class occupiers, and, consequently, are difficult to obtain; whilst animals miscalled Herefords, Short-horns, and Galloway Scots, abound; in addition to the Welsh and Irish cattle, from which the best animals have been selected on their way, by dealers of every denomination.

Let us then imagine a farmer, having his twenty acres of root crops, going once a year to a fair to purchase his quota of ten or twelve oxen, as he states, to *tie up.* He has no selection whatever, beyond those that have been culled over at every preceding fair or market they may have passed through. Resting upon his own judgment, which in most cases is inadequate to the task, he secures his object, and, without reference to the qualifications we before alluded to, except in number, but with little attention to every other qualification, frequently purchases without any regard to touch, or other essential requisites in point of form, breeding, and fattening propensity.

After having obtained the animals, his next step is to make them fat as quickly as possible. These animals probably having been driven until their hoofs are cut through, and otherwise beaten down by fatigue and hard usage, are immediately stalled, or turned into an open yard, without shed room, and one of two modern processes of fattening pursued—the one by giving them an unlimited quantity of roots daily; the other, by giving in addition an unlimited quantity of oil-cake, meal, or stimulating food *ad libitum.*

By the first mode, the animals slowly improve, but they generally advance in health, and if young, which will more probably be the case, still continue to grow fast; and if put to food in November, will, in the following March, have possibly arrived at a proper stage to be made fat under a judicious system of management; but it is then generally found that the turnips are exhausted, and the mangel wurzel well nigh finished. Cake and meal are thought expensive, so at once they are sent off to market at the time when it is probably glutted with half-fattened animals; and the draft of the salesman, by the next post, announces that "there is little profit in winter-feeding oxen."

In the other case, the owner looks to the manure heap for his profit; and, as he knows that oil-cake and bean-meal add greatly to its quality, he begins at once to feed liberally with those expensive articles, and is equally liberal with his turnips or mangel wurzel; he tells his neighbours that his bullocks eat daily four bushels of those valuable roots, and three oil-cakes per diem in addition. His bullocks, however, do not shew an adequate result; their skins still stick closely to their ribs; their coats stare; "the bullocks do not go on well, can't tell why;" but the shortest way is the best, and in the end the cheapest; they have, however, made a good heap of manure, and off they shall go next week. What is the result? Winter feeding does not pay, and Mr. Mechi is so far right.

Can it pay? did it ever pay under such circumstances, and with such management, and with probably two commissions to salesmen, of from 10 to 15 per cent. in four months, in addition?

This is the general mode of arable feeding, as it is carried out. Let us examine the result when conducted as it should be—taking reason as our guide, and common sense as our instructor.

In the first place, "breeding will always beat feeding." A well-bred bullock, fine in his touch, with plenty of hair of the right quality, and having his frame and points good, in a thriving and healthy condition when put into the stall, is a very different description of animal from those before described, to begin with. Well, now, as to the mode of treatment. Suppose we have both swede turnips and mangold, we begin upon the former by pulling or slicing them thinly, and mixing them with cut chaff, made from good, sweet oat straw and hay, in the proportion of three pounds of the former to one of the latter, altogether about 30 lbs., mixing one bushel of swedes of 56 lbs. with 15 lbs. of the best chaff, moistened with water in which linseed meal has been steeped forty-eight hours, at the rate of 2 lbs. each bullock per diem, with 3 lbs. of bean or barley meal, the quantity of which may be increased as we proceed.

We will now state *pro* and *con*. the advantage and disadvantage of this mode of feeding.

In the first place, roots should be considered merely as an *adjunct* in feeding; they contain too large an amount of water, and too little of fattening substances, to enable them to be judiciously employed alone, and are quite as expensive. We say expensive, knowing that they may frequently be sold at a price that would replace other fattening substances of highly nitrogenous quality; or by a judicious combination, double the number of cattle might be fattened by the assistance of the same quantity of roots. Mangel wurzel contains about 80 per cent. of water, and, therefore, no more should be given than is requisite, to insure the cattle from scouring, which it universally induces if fed by itself, in large quantities, and with swede turnips also a moderate-sized ox will consume 200 lbs. daily, if allowed to feed them separately *ad libitum*, and will then refuse cut chaff, unless it consists principally of sweet hay, whilst it is admitted by experienced men that oat straw, in combination of from two-thirds to three-fourths, is better than hay alone. At the present moment the relative prices of cattle food are as follow:—

10 lbs. hay, at 70s. per ton.
4½ lbs. beans, 42s., or barley meal, 32s.
3 lbs. oil cake, £13.
2½ lbs. linseed meal, 64s.
4½ lbs. oats, 28s.
70 lbs. mangel wurzel, 10s. per ton.
70 lbs. swedes, 10s.
24 lbs. cut straw chaff, 16s. per load.

All these quantities are equivalent in price, but the feeding value of them is very different in amount: any five of them is equal to 20d., the day's keep of one bullock of 50 imperial stones.

Here, then, we have the full cost of feeding a bullock at 1s. 8d. per diem, or 11s. 8d. per week. In twelve or fourteen weeks, under this management, we venture to assert that he may be rendered fit for market; and we have no hesitation in asserting also, that three-fourths of this sum will be profit, and leaving one-fourth for manure.

In addition, we ask, can an animal progress favourably, if confined upon a latticed floor, when every motion produces unequal pressure upon his hoofs? and when he further changes his position, he does so only to remove the pain he endures from one part of his frame to another.

We feel assured that the cause of cattle not paying for winter grazing arises mainly from their being, in the first instance, ill-bred, and reduced too low in condition previously to their being stalled and fed daily upon stimulating food, which is, also, injudiciously applied and irregularly bestowed.

"TWENTY SCOTS FROZEN TO DEATH," *v.* CATTLE MARKETS.

The fact of "twenty-one horned and polled Scots being frozen to death, on passage from Aberdeen," as stated in the Smithfield Cattle Market report of Feb. 12, is probably the best intercession we can make for the "poor sheep" of "AN AGRICULTURIST," a correspondent in the same number of the *Mark Lane Express.* If we could only reach the ears of farmers who clip their sheep in weather like the present with such, few of them we hope would continue to pursue a practice so devoid of humanity as it is of profit; but the difficulty lies in this, for those who are guilty of such mismanagment seldom, we fear, read agricultural journals, or pay much attention to the cultivation of intellect by any other means.

The above disaster renders the marketing of fat stock in weather like the past week a very important question, and the more we get into the practice of house-feeding improved breeds of cattle, the more interesting will it become; for house-fed stock of this quality may justly be compared to hothouse plants, so that the turning of them out, and compelling them to *stand* 48 *hours* (!) exposed in frosty weather, is almost certain to prove fatal, as in the above case, even although not on board a steamboat in heavy snowstorms.

The cruel fate of the unfortunate Aberdeenshire fat cattle is soon told. On Wednesday the 7th current, some 50 horned and polled Scots were put on board an Aberdeen steamer for the ensuing Monday market, in Smithfield. Of these, only 29 reached the metropolis in life; the ship-herd having found it necessary to slaughter, or rather bleed 21, about 20 shorthorned crosses, and one polled, so as to turn them to some account. A portion of the cattle had travelled for a considerable distance, prior to shipment, and were therefore, no doubt, in a fatigued state, while others were in good travelling condition. The vessel arrived in the river on Friday, after having experienced one of the roughest passages on record. The first night was piercing cold, which continued throughout the whole of Thursday, accompanied by sleet and high wind, the sea at times rolling over the deck, where the unfortunate cattle stood. Thursday night and Friday were nothing better; consequently the position of the suffering animals from cold, an empty stomach, sea sickness, and tossing against the steamer, bending and breaking iron bars and fastenings stronger than their own bones, may be easily imagined, and accordingly by Friday morning the herd had to commence the operation of bleeding, as already noticed. On Wednesday night and Thursday he laboured incessantly to keep his charge upon their legs with success so long as their sinking strength rendered such practicable; but by Thursday night such began to fail, when victim after victim fell before the tempest to rise no more. In this prostrate position the stiffening influence of the cold soon called upon his knife to terminate the sufferings of the poor brutes, so as to prevent their being frozen to death. Thus perished twenty-one head of fine fat cattle, obviously involving, with our network of railways, no small amount of mismanagement, generally speaking, and sacrifice of property, to say nothing of the cruelty experienced by the animals; while the whole affair, from first to last, furnishes a lesson instructive to every province of the kingdom. We understand the 21 carcases have realized from 2s. 6d. to 3s. per stone; but while this reduces the loss, it gives rise to questions not the least discreditable in the transaction — questions which call for sanitary investigation at the instance of the metropolis.

The position of animal life under circumstances of this kind, whether conveyed by steam-boat or railway, merits further consideration, in order to illustrate the differences between cases which may terminate fatally, as the 21 above noticed, and those where health is less or but little injured, as the 29. And for this purpose we shall give examples of both oxen and sheep under different management, modes of conveyance, and degrees of temperature.

In the case of the ox which has been house-fed from calving up to the time it is sent to market, being during the whole of this period forced forward according to the most improved system of feeding, summer and winter, the animal knows nothing of frosty weather any more than the inhabitants of Central Africa, consequently it is not prepared for the hardships experienced in connexion with Smithfield during winter storms; indeed, of the two it is the least able, from the artificial and pampered state of its body.

This pampered state of health, just mentioned, requires no ordinary skill and circumspection to preserve it in the feeding-box itself—as every experienced feeder is well aware; and if the greatest care is thus necessary to preserve uniformity of treatment and health within doors, what must be the consequences when the animal is turned out to hardships such as fat stock now experience in attending Smithfield?

It is much more easy to imagine the sufferings of the poor ox, when thus treated, than to describe them. The first effect of the open atmosphere upon his system is a state of levity analogous to intoxication: hence, how he leaps and gambols, under a degree of excitement which soon throws him into a state of perspiration, thus exhausting both his nervous and muscular systems, and putting his whole body into a state of greater susceptibility to cold, when placed in the railway truck or steamboat, than it otherwise would have been. If allowed to lie down in this state, as was stated in the case on the deck of the steamboat, from sea-sickness and the rolling of the vessel, the result may soon be death; for the circulation of the blood would be almost immediately stopped by the severity of the frost which has lately been experienced during night. Indeed, few such oxen would survive the passage between Aberdeen and the metropolis.

In the railway truck, the health of the ox, from standing on his feet, closely wedged between others, and from the absence of sea-sickness and the motion of the vessel, is some degrees better. It is still, however, a matter of degree; for we cannot suppose, under any condition, his heated body not to suffer; and when allowed to lie down in an open yard, after arriving at the Metropolis, exposed to the full influence of the weather, there is even danger, as on board the steamboat.

When the ox is frozen to death, the farmer's loss is easily estimated; but when only partially injured, or suffering from catarrhal affections, &c., it is otherwise; for then losses are often attributed to bad markets or bad management, the difficulty of getting him to acknowledge misconduct in the feeding and driving being just as great as that of butchers and salesmen, or railway and steamboat companies, after the ox has passed into their hands. That a loss, however, of no ordinary magnitude is sustained, neither of them can deny.

The practical question, it will thus be seen, is to obviate the losses sustained by improving the mode of conveyance and management during marketing to a state compatible with the progress which has been made in the breeding and fattening of cattle; but before offering any observations on such, let us first glance at one or two more examples somewhat different in character, under the maxim that "to find out the seat of the disease is to effect half the cure."

If the ox has been put upon the railway or steamboat not heated previously by driving, the injury received will be less; though it still may be great, and even fatal when the constitution is delicate, as is frequently the case from extra feeding.

In making this remark as to delicacy of health, we are not to be understood to infer that improving the breed of cattle is done at the expense of constitution, for nothing could be more anomalous and further from truth than this. On the contrary, as we improve the breed we must, of necessity, also improve the constitution, or no progress has been made. In point of fact we have always had fewer constitutional maladies among our improved breeds than among those not improved; and we have no doubt that the statistics of facts generally would do far more than bear out this conclusion. But while we have improved the constitution, we have also placed it in a more artificial state—one less able to endure the inclemency of our winters; while we are at the same time loading it with double the weight of fat at an earlier age, when bones, muscles, and every other part of the body is less able to bear such an increase of hardships: hence the consequences which follow.

When the ox, again, has not been house-fed, but brought up exposed to all the vicissitudes of our climate, summer and winter, as in grass-fields and straw-yards, his body will consequently be in a state better qualified to endure the above hardships, even although equally fat, than his house-fed rival; for, in the first place, he will have a thicker coat upon his back —a gift which Nature has given him to meet the exigencies of his exposed situation, although at a sacrifice of food; and secondly, the functions of his body for keeping up animal heat will be accustomed to the laying up of an extra store of fuel in warm weather and burning it in cold; and hence, if not overpowered, may be able to triumph over the hardships of snow-storms and frost in marketing, merely by the daily consumption of a few extra Smithfield stones of his fat!

The profit-and-loss view of the question in this case becomes a blank! the waste of fat being beyond the sight of either buyer or seller; for the former, accustomed to slaughter, under such circumstances, concludes the ox will just weigh so much, and then strikes a bargain accordingly; while the latter, however much the price may fall below his expectation, rests satisfied that he himself would not have realized so much as his salesman; and here his interest in the matter rests without further inquiry!

The position of the sheep during marketing is even worse than that of the ox, owing to the slowness of its pace, its excitable character, the large proportion of fat which it carries, a heavier coat of wool, a greater tendency to get into a state of perspiration, and hence to catch cold, with its consequences. Such indeed is its position in the over-crowded state of Smithfield, that it were difficult to say whether the clipped or non-clipped sustained the greatest loss when good and bad weather are put together. In stormy weather, like the present, there cannot be a doubt, for instance, but the clipped sheep sustains the greatest loss; while in wet, close, and warm weather, as it generally is in Smithfield in the absence of frost, it is equally plain, on the contrary, that the woolled sheep loses most in the market: so that the solution of the question lies between a comparison of good and bad weather. In the new market, sheep, it is true, will be spread over a much larger area of ground, in a more open, elevated, and healthy part of the metropolis; so that they will have purer air to breathe, and hence be freer from excitement and perspiration; and if they are put into the market-lairs direct from the railway, and then from the former into the market-pens for sale on the morning of the market, the amount of perspiration, excitement, and loss of fat will be further decreased; while the animals will be in a more fit state to endure the exposure in the market, and during the removal to its lairs, or those of butchers, for slaughtering; but with all these improvements, more, we fear, must yet be made before the Markets' Improvement Committee can frame bye-laws to obviate the losses sustained; for something more practical, we aver, is required than this—*something involving more of chemistry and mechanics than law*.

Such is a very superficial glance at the position of fat stock during marketing in the inclement season now and lately experienced; and from what has been said, it will readily be perceived that considerable progress must be made in science before the losses at issue can be obviated. Farmers, for example, must think of cattle-vans for conveying their improved breeds of fat stock to railway stations and steamboat quays; railway companies, of conveying the ox, as they do the horse, in single boxes; and steamboat companies, of a cabin berth, in which the fat ox, instead of being frozen to death, can rest at ease; while Market Improvement Committees will have to provide fat stock bazaars with feeding-boxes, in which he can be tied up daily during the hours of sale, and loosened and allowed to lie down and ruminate at ease when sold, until required for the shambles. Ditto may be said of sheep, substituting pens for boxes, not more than three sheep in a pen. These are improvements which modern agriculture has not only sanctioned as sound in theory, but acknowledged as absolutely necessary to the successful management of our improved breeds of cattle; and when old-fashioned farmers, railway and steamboat companies, and Metropolitan Market Improvement Committees have got this length in the march of progress, their more pioneering friends a-head will tell them Experience' own tale, that the mismanagement, losses, and cruelty to animals complained of, can only be obviated in the dead-meat market, when cattle bazaars can be converted into livery stables for dairy cows; thus providing the greatest of all luxuries—plenty of good milk—for the rapidly increasing millions of the capital.

THE BREEDING OF STOCK ON ARABLE FARMS.

SIR,—Some weeks ago I addressed a letter to you on the subject of Dairies *v.* Pianos, endeavouring to take the part of farmers' wives and daughters. I do not regret having done so, but I really fear that at some of our large "dairy farms" the fathers and sons are playing the piano, the wives and daughters looking after the dairy, and, alas! the bulls and cows after themselves.

I am, Mr. Editor, an *arable* farmer, occupying about 300 acres of land, not 20 of which are meadow or pasture. I farm on the four-course system, consequently grow nearly 70 acres of swedes, turnips, and mangold. I have 120 to 130 breeding ewes. Their produce (about 180 lambs) are fed off as yearlings, with the exception of a few *ram* lambs and the *ewe* lambs necessary to replenish the flock. Now, this flock does not nearly consume my root crop, and I have a large quantity of straw to convert into manure. This I have done by stall-fed short-horned cows and outlying Hereford bullocks, receiving, in addition to cut swedes and mangold, about 2lbs. oilcake, 1lb. rapecake, and 2lbs. barleymeal each per day, with cut straw, &c.; and, with ordinary management and honest cattle, have not made them so "losing a game" as Mr. Mechi's "necessary evils."

But, Mr. Editor, there is a serious evil increasing in our neighbourhood. We cannot breed and rear a sufficiency of stock on purely arable farms for the consumption of our roots and straw, and are dependent on a supply of draft cattle from our neighbouring dairy counties. I have reason to believe that for our purpose nothing pays better than a short-horn cow, after a certain period of usefulness to the dairy. I now speak truly and feelingly. Quite one-half of the cows "tied up" in this district, which were bought as "barrens," are now just *whitewashed*, or not half fat, and are being turned out of the stalls with calves in them. My cows came chiefly from the Ashbourn October fair, and out of twenty-two bought for barrens I have *one* calved—*two* picked calf—*four* selected early from the house, having four good quarters, as calving cows—*four* last week necessarily disposed of to the butcher, being heavy in calf and faulty in udder (one of them only two teats sound)—and two in the stalls I can touch calves in. Thus I have perhaps nine barren cows out of twenty-two, and I am well off in comparison with some of my neighbours, one having seven in-calf out of eight purchased as barrens; another, four out of five. I need not tell you, Mr. Editor, this practice of selling in-calf cows for barrens is a serious thing for farmers placed in similar circumstances with myself. When purchased, the calves are not "touchable;" and for a considerable period I was unwilling to disbelieve the word of a respectable man, who assures the purchaser the cows are really what he professes to sell, "barren." It may be answered, "If you do get your cows in-calf at a barren's price, you are a lucky man, as they are worth more to calve." But I say, Not so. Cows, after long travelling, do not well to be turned out in a cold November, to ascertain by their actions what state they are in. Besides, we have no grass to turn them into, and are necessarily compelled to tie them up immediately, and commence a course of feeding much too expensive for a cow four or five months from calving. Then look at the result of selecting calvers from these mis-named barrens. Like a flock of ewes, so is a stock of cows: some must be drafted annually; and, of course, a man naturally draws the worst for disposal. My cow with the calf was so viciously inclined, previous to calving, towards comrades and pigs, that we put knobs on her horns, and kept her with two others in a loose yard, where she ruled absolutely; she was verily "the cow with the crumpled horn;" and though she did not "toss the dog that worried the cat," she kicked her new-born calf, milk-pail, and attendant, and is even now wild and untractable. Two, I stated, have picked calves in the house: this retarded their progress at least a month, and they most likely were disposed of for playing a similar trick before. Then the bad quarters, the slippers of calves, all addicted to vice, would make good fat cows were they barren; but with calves, or in-calf, they are likely to remain on your hands, as a kicker with three teats is considered anything but a profitable investment.

I am sorry if I have been trespassing on your space; but we must look to our weekly paper for help on agricultural topics, as parties are often ready to reply to a friend in difficulty. We want some short-horned cows—*barren*, not cows sent from home because worthless as breeders, and yet with calves in them, to entail a similar loss on the unfortunate purchaser the sellers themselves probably experienced the previous year.

Shiffnal, Salop. H. S.

THE SEWAGE OF THE METROPOLIS, AS AVAILABLE IN AGRICULTURE.

However true the calculation that the produce of our country has been largely increased, and that, too, mainly by the better manuring of the soil, yet equally certain is the conclusion that much yet remains in this way to be accomplished. The harvests reaped by the skill and enterprise of "the proud island's" farmers are indeed great. They have not confined their attention to the improvement of the richer soils: they have carried the plough on to the hill-tops; they have raised cereal crops on the very verge, as it were, of cultivable limits. This they have achieved on inferior soils, in northern districts, and at elevations where nature, from the lowness of the mean temperature, seems to almost forbid the ripening of such crops. But amid all these successful efforts, these quiet yet noble conquests over nature's obstacles, the English farmer has wisely regarded them as mere stepping-stones to still better modes of cultivation. He has not been content to enrich his soils with even artificial manures in one form. From the use of dry, friable fertilizers, he has enquired, and rationally too, if this was the best mode of applying the manure? and whether the same amount of dressing applied in solution, or diffused in water, might not produce still greater effects.

The trials with the water-drill have certainly seemed to prove that such good results are accomplished. The crops of roots produced by the use of the water-drills of Chandler, Spooner, and others have, indeed, almost invariably, we believe, exceeded the crops grown in the parallel trials with the ordinary manure-drill. There is every reason to believe, also, that much more attention will be paid to the use of the pump in applying weak liquid manures than heretofore; that land-springs, river-waters, the sewage of towns, will all be laid under contribution by the farmer's steam-engines: and even within the last few days, one or two considerable movements have taken place, tending in this direction, well worthy of our readers' observation. As was intimated last week, it is now finally determined that the entire sewage of all that portion of London which is south of the Thames should be gathered together into one large tunnel sewer, and no longer be allowed to poison the water of the Thames. The Court of Metropolitan Sewers then unanimously resolved that a main sewer of the requisite dimensions should be forthwith constructed, commencing at Lambeth, and terminating in the Kent marshes, below Woolwich. This deeply-placed sewer will collect from its tributary drains the sewerage of at least half-a-million of inhabitants, and convey the whole of these matters into or below Plumstead marshes, where it will be constantly raised by powerful steam engines into a reservoir, from whence, at the *first ebb* of the tide, it will be let into the Thames. That is, it will be allowed to be thus wasted, through large sluice-gates, if there shall be no means discovered of profitably extracting its enriching ingredients, or what is much more unlikely, if the skilful Kentish farmers allow it thus to escape them.

But when the stream of riches is brought to their doors, as it were—when these hitherto numberless little foul streams are gathered together into one great, one never yet equalled flood of liquid manure, and carried into Kent—are we not warranted in the conclusion that the same engines which (until another and a better direction is found) are to pump this huge mass into the Thames (about 15,000,000 gallons per day) will soon be employed in raising it to a much higher elevation?—into, most likely, covered channels, from whence it will be well distributed over the poor thirsty uplands of "the garden of England"? This, too, is only one, and the smaller instalment of the sewage of London which is to be speedily poured into the country; a still larger mass of sewerage—a river of liquid manure of four times the size of that to which we have alluded—is to be soon formed under the northern shore of the river; and this will, in a similar manner, convey to or below Barking Creek, on the Essex shore, the entire drainage of more than 2,000,000 of inhabitants. But these are not the only enriching streams to which the farmers of England will soon have access. The citizens of other ill-drained towns are fast waking up; they, too, now see the madness of sleeping over or amid cesspools, or of allowing their sewerage to mingle with the waters of their wells or rivers. In consequence of this "sleep of death" being broken in upon, new arrangements are now making in many English populous places to carry their sewerage far away from their houses. And let us conjure the managers of these noble sanitary improvements not to be fearful of the extra expense of extending these main or final-delivering sewers to the utmost possible extent; let them be cheered on, when they are regarding the proposed outlay, by the undisputed truths that the farther the point of delivery is removed from the town the better it is for the health of its inhabitants, and the more valuable to the farmer is the liquid manure which they discharge.

The value of some of the sewage of London may be estimated by the results of the analysis of Professor Way of a gallon of this fluid, obtained from Barrett's-court sewer. In this he found—

	Grains.
Organic matter and salts of ammonia	301.82
Sand and detritus of the granite from the London streets	20.69
Soluble silica	12.51
Phosphoric acid	10.44
Sulphuric acid	14.73
Carbonic acid	15.59
Lime	24.53
Magnesia	2.87
Peroxide of iron and alumina	6.20
Potash	48.13
Soda	1.51
Common salt	33.24
	492.26

Let our readers consider the importance of these facts, and let them watch carefully the progress of the bills now before Parliament for the promotion by good town-drainage of the public health. Few, if any, facilities have been hitherto afforded by the Legislature for the distribution of foul irrigation waters; and yet the enacting of the mere power to carry drains, under proper restrictions, beneath public roads and through lands, would afford, in many instances, great and valuable facilities to the landowner.

PROGRESS VERSUS PRESUMPTION AND PROCRASTINATION.

Sir,—If every man were thoroughly to examine every theory brought before his notice, and be sure that he fully understands the subject, before he ventures to condemn it, we should not have so much childish nonsense and ill-natured opposition manifested towards almost every person who ventures to develope anything contrary to all old habits or prejudices, however much the practical application may be to the general good.

I have been led to write these remarks in consequence of your correspondent "S. S." having, in his letter in your valuable journal of the 29th ult., in respect to Mr. Wilkins's mode of applying liquid manure to the roots of plants, so confidently described the *modus operandi* and the *£ s. d.* results of such proceedings, which, to use his own expression, "betrays either a want of proper consideration, or wanton ignorance of the subject he proposes to teach."

In the first place, Mr. Wilkins's system does not require the *surface of the land* to be made as nearly level as possible, to allow the liquid manure to percolate, as "S. S." endeavours to make your readers believe. The surface may be undulating or otherwise. It is the impervious tray bottom which requires to be laid nearly level, without reference to the surface of the land.

In the next place, it is altogether a mistake to suppose that the open (inverted) half-tiles require to be laid "*on that floor, at every distance which may be required, to be exactly under the roots of the plants he intends to cultivate.*" This gross mistake, I think, can only have arisen from the supposition that the roots of the plants were to receive their nourishment from the liquid manure running in the drains; whereas the manure runs on the bottom, and the half-drain-tile is merely to keep a clear channel, by preventing the subsoil from stopping it up, while freely percolating over the entire liquid-proof bottom, to the height of the sides, and (by capillary attraction) to the soil above, so that these tiles may be placed about eighteen inches apart, and the plants or seeds deposited in any position, without reference to the tiles below; so that, once laid down in a proper manner, no shifting is required, as the arrangement will last as long as the materials will hold the liquid, and the land be always ready for the same kind of crops in succession, or by rotation, as may be found by experience most advantageous.

Your correspondent, I regret to say, betrays very great selfishness, which for the sake of progress in agriculture is too prevalent among farmers. He advises Mr. Wilkins to purchase some desirable place to carry out his principle—"*that he lay the whole down according to that principle, and record faithfully his expenditure in so doing, and year by year prove that with his very large crops he is enjoying very large profits. Then, I for one, &c, shall be only too happy to follow his footsteps.*" Noble suggestion! generous soul! Instead of hailing Mr. Wilkins as a friend, a benefactor to humanity, by showing how LAND, LABOUR, and CAPITAL may be unitedly employed in making our country independent of foreign-grown food and other valuable materials, and encouraging him to go on with his project by giving him a helping hand, obstacles are placed in the way, by misrepresentations of the system and its cost, only offering to follow his footsteps after he has probably spent his life and means to convince such as S.S., who are watching for, and ready to grasp at the "large profits," without incurring any risk or expense in making the experiment from which these profits are to be realised.

Having had an opportunity of seeing Mr. Wilkins' experiment at Reading, I was informed that the brick bottom was only adopted there to save the season, and that the expense incurred for brick may be avoided by adopting concrete with cement, and various other combinations equally suitable for the purpose.

In conclusion, I beg to forward you a statement, showing the difference between Wilkins' mode of growing flax, and that of the Royal Society for the growth of flax in Ireland:—

A CONTRAST.

Extracts from directions by Royal Society for the Promotion of the Growth of Flax in Ireland after Twelve Years' Experience (1852), *and receiving* £1000 *a-year from Government.*	*Mr. Wilkins' Experience in* 1853 *and* 1854 *of application of Liquid Manure by his patent process.*

Soil.

" By attention and careful cultivation, good flax may be grown on various soils; but some are much better adapted for it than others. " The best is a sound, dry, deep loam, with a clay subsoil."	Soil does not feed plants. They derive nourishment from liquefied matters, derived from manures applied to their mouths or roots. Any soil will, therefore, suffice to be the medium for conveying by capillary attraction properly prepared liquid manure to the roots of plants, and especially to flax and hemp.

Drainage.

IRISH FLAX SOCIETY.	MR. WILKINS.
" It is very desirable that the land should be properly drained and subsoiled; as where it is saturated with either under-ground or surface water, good flax cannot be expected."	Drainage is immaterial. All the expense to be bestowed on the soil should be for the proper and durable preparation of the floor of tiles in cement or clay, on which is to rest the manure channels, and the earth in which the plants are to grow. The earth is charged once a-week, or oftener, with largely diluted liquid manure, and that is attracted to the surface by the earth and roots; any surplus moisture is allowed to escape by natural absorption into the soil. Water alone on this principle used in summer.

Rotation.

IRISH FLAX SOCIETY.	MR. WILKINS.
" .... different soils require a difference of rotation. In the best soils of Flanders flax is grown in the third year of a seven-course rotation, or the fifth year of a ten-course rotation. " It is not to be considered generally advisable to grow flax more frequently than once in ten years; not because it exhausts the land more than any other crops, but because good *flax* cannot be had at short intervals on the same soil.	Very little rotation is required. As long as the supply of nourishment is continued, and warmth is to be found on the surface, crop may succeed crop. Two crops of magnificent hemp, each 6 feet long, were obtained from the same spot of earth in 1854, each in about eleven weeks. Fine specimens of flax, nearly 3 feet long, have also been obtained. These were exhibited at the meeting.

Ploughing.

IRISH FLAX SOCIETY.	MR. WILKINS.
" After wheat, one ploughing may be sufficient on light friable loam, but two are better; and on stiff soils three are advisable—one immediately after harvest, across the ridges, and two in spring, so as to be ready for sowing in the first or second week of April."	The effect of applying liquid manure below the roots of plants, and at a proper depth in the soil, is, that the soil is always in a friable state, as there is only enough moisture to keep it porous, and the sun's heat is never prevented from penetrating by a hardening of the surface. It is questionable whether any ploughing will be required on lands so treated—only a little forking.

I am, Sir, yours, &c.,

8th February, 1855.

A. C——.

EXPERIMENTS ON TURNIP CROP.

In addition to their efforts for the improvement of stock of all varieties, the Angus Agricultural Association last year appropriated £30 of its funds for reports on experiments with extraneous manures applied to turnip crops last year, holding Peruvian guano at the rate of 3¼ cwt. per imperial acre, and applying the other manures at an equal money value for the trials. The following is the table showing the results of experiments with eighteen different special manures or combinations, by five members of the Association, viz.:—Messrs. William Fullerton, Mains of Ardestie; William Smith, jun., West Drum; Alexander Pattullo, Strathmartine Castle; Peter Pattullo, Eassie; and William Ruxton, Farnell:—

Qualities of Guano and Artificial Manures.	Mr. William Fullerton. Stiff Black Loam.		Mr. Wm. Smith, jun. Loose Dry Black Soil.		Mr. Alex. Pattullo. Very Light and Muirish		Mr. Peter Pattullo. Deep Black Soil.		Mr. Peter Pattullo. Open Clay Soil.		Mr. William Ruxton. Muirish Gravel.	
	T.	C.	T.	C.	T.	C.	T.	C.	T.	C.	T.	C.
Peruvian Guano.	20	8	13	10¾	18	18	20	11	18	11	12	7¼
Patagonian do.			7	7¼								
Australian do.			9	5¼								
Ammoniacal do.					16	0	17	8	17	4		
Bolivian do.					16	6	20	2	16	4		
Johannah Bay do.											11	4¾
Bone Dust.....	16	14½										
Dissolved Bones	17	12	11	12					15	17	11	10
Superphosphate			9	14¾	17	11	17	18	15	10		
Blood Manure..					16	4	17	18	16	17		
Economical do.					4	0						
Bailey's do.	20	12	10	10							13	2¼
Stalker's do.	20	5										
Tyne Co.'s do.	19	3¼										
Somerville's do.			10	18½			17	10	16	10	11	14
Peruvian Guano and Dissolved Bones or Superphosphate.	19	17			18	19					13	8¼
Ten loads dung and two cwt. Guano......			14	12½								
Bailey's Manure and Peruvian Guano......											13	14

NOTES.—In these experiments Peruvian guano applied at the rate of 3¼ cwts. per imperial acre was taken as the standard, and all the other manures were applied at a money value corresponding thereto. Sufficient data are not given in the different experiments to enable reporters to state the money value of the different manures. Peruvian guano averages about £11 10s. The different manure makers will be able to state their selling prices last year, and thus afford a guide for the ensuing season. In the weights given above, the bulbs only are taken, excepting the economical manure, which also includes tops.

Prepared by

(Signed) PETER BAIRNSFATHER, of Dunbarrow.
DAVID LYALL, of Gallery.

One of the experimenters adds, at the end of his report—"The manure manufacturer has now at hand the mineral phosphates in such abundance, that there is certainly every encouragement for him to proceed both in improving the quality and extending the supply of his manures. The continued rise in the price of Peruvian guano may, by another season, turn the balance in his favour; and so long as these experiments shall be encouraged and supported by us, we keep up a good security that, in the face of them, no very glaring attempt at adulteration will be practised, so far at least as the supply to this county is concerned. In many respects these trials are more satisfactory than if recourse were from time to time to be had to the analytical chemist; for, apart from the general reluctance of farmers to make frequent calls at the laboratory, every individual experimenting has the opportunity of observing from actual trial what best suits his particular soil."

THE EFFECTS OF FROST UPON THE OPERATIONS OF THE FARM.

"Cease, rude Boreas!" may well be the cry of our rural population during the late-prolonged inclemency of cold and snow. In tillage operations there is "nothing stirring but stagnation;" for the frozen ground resists alike the ploughman's share and the drainer's spade. But now is the time to test the farmer's commissariat—to save his live stock from any approach to a Crimean starve. Sheep, which have been thinly distributed over the grass-lands at the beginning of winter, have for some time had their pasture nipped by the freezing winds, and now scrape from beneath a covering of crisp snow a herbage more like woody fibre than nutritious grass. Lambs, too, drop upon the comfortless scene, finding, instead of verdant meads, a *Green-land* indeed. Shelters of straw or stubble must be maintained both in the grass-fields and in the turnip-fold: in the latter, it would be best to have erected small, low sheds, with straw and hurdles, before the snow-blast arrived; and where a court or yard is available, a portion of the flock should be shut up, and supplied with sliced roots, and plenty of fresh, dry straw to lie on. Swedish turnips are frozen till their flesh is hard and yellow; and even if cast up into heaps, and earthed up (as they should be), their condition is little better; for these heaps are frozen through, and often to be opened only with the pick. Therefore, a due supply of cut hay, oat-sheaves, &c., must be given, both to the sheep in fold and on the grass-lands. The chaff-cutter must be kept vigorously at work; and the roads, hardened like railways, afford extra facility for the continual carting of straw and dry fodder. And if the farmer means to preserve a healthy flock through this trying season, he must not be very sparing with corn and cake in his sheep-troughs, especially with breeding ewes. Horned cattle are not left, as in the old-fashioned times, to pick their own winter subsistence in grass-fields, where hay-ricks had been stored for them in the summer; but are shut up in comfortable quarters, whether they are intended to fatten or not—they are no longer kept (as some ancient farmers might say), in a "natural," but an "artificial" state; and so must be constantly watched and supplied with their allowance of hay, straw, roots, chaff, cake, corn, or whatever food is to be their portion. And what with preparing linseed, &c., for fattening beasts, and cooking food for hogs, the steaming apparatus should now be in full action. All the extra care required for the live stock of the farm, horses included, at this juncture, helps to employ hands that would be otherwise in an enforced pining idleness. But there are even extra minute matters to be attended to now—as for instance, not only to pump water for the yard and hovel stock, but to break the ice that they may be able to drink it: even ducks and geese, which usually find water for themselves, must have holes daily broken for them in their ponds, or the farmer's wife may *really* be able to reckon her ducklings and goslings before they are hatched, the expectant produce being *nil*.

It is gratifying to know that, in a protracted season of bitter weather, difficult as it may be to avoid paying off labourers, to seek a temporary sustenance in the shooting of wild-fowl, or mere amusement in the exercise of skating, we have greater means for employing them than our forefathers possessed. Besides all our labour in stock-feeding, we are more neat and tasteful as well as economical in our management of fences and timber. If the earth is as stone against the entrance of a tool, boughs are not proof against the axe and bill; and in "lopping," "taking out," "felling," in "siding-up," "plashing," "buck-heading," numbers of hands have been at work upon trees and hedges. But thrashing has been one of the principal hard-weather operations. The farmers in some counties still refuse to give up the old practice of knocking out their corn by the flail; it keeps their men in work through the winter. But in addition to the superior work made by thrashing-machines, and the consequent saving in corn, the greater expedition of the process, and consequent independence of the farmer as to choosing his market, we cannot think that the amount of labour now working them falls short of that which would have been in work by the flail system. For during the short time when scarcely any other labour but thrashing is possible, we now thrash out with many hands—men, women, and children—and in other portions of the winter, we are busy with many operations and *improvements;* for which, with the flail constantly flying, we should have no hands to spare. Of course, this remark will not apply in equal force to the use of the steam thrashing and *dressing* machines, which need very few labourers to look after them, and leave little after barn-work in winnowing.

What can we do with our teams? Well, it is a great satisfaction that we have hard roads for carting stubble, straw, roots, &c.; for delivering corn at the port or railway; for fetching coal, carting wood, &c.; so that the horses have not been plunging and straining in holes of mud and mire, as is too commonly the case in wet winters. Therefore, besides flogging our giddy quadrupeds round the "horse-works" of a thrashing-machine, as is yet the continued and unnatural practice, in spite of all the multiplication of portable steam-engines, we may level earth banks, fill up holes, alter the direction of crooked drains, and carry out further quantities of chalk, marl, and clay upon our land. Suppose we turn to a "Calendar of Operations" for admonition what to do: it tells us "Beans are to be sown early this month"! Are the seasons so out of course then? If such meteorological tricks continue, the calendar-makers will be obliged to write two sets of opposite directions—such as the diplomatists have—according to "the way the wind blows." As it is, we can only spin out January into February as well as we are able, hoping soon for mild weather enough to do February and March both in one.

We may sometimes doubt whether our shivering wheat plants, frozen blade and root, will have enough vigour left to push up with speed at the thaw; but still it is a consolation to feel that the same extreme cold which makes wild birds and shy vermin audacious, is destroying for us innumerable grubs and minute pests, and that we have no need to fear "the gardener's worst enemy"—a precocious spring. And if we are debarred from ploughing and tillage, it is a pleasure to strike one's foot through the upheaved winter furrow-slices of our fallows, now powdery from the pulverizing tooth of frost, which has fertilized in a way that all our horses and implements could never have equalled in ground wet from an open winter.

CALENDAR OF AGRICULTURE.

The sowing of spring grain proceeds rapidly during this month. Sow oats, vetches, peas, beans, and flax, and barley in the favourable end of the month. Prepare lands for early fallow crops; sow lucerne, 12lbs. to 20lbs. to an acre, on deep and warm soils, well dunged and cleaned; and sainfoin 1½ cwt. to an acre, and dress with gypsum. If the season be favourable, sow carrots and parsnips on warm loams, prepared the previous autumn, in good condition and subsoiled, and drill on the flat surface 18 inches apart. Steep the seeds in leys of urine, or in a solution of nitrate of potash, six to one; dry and encrust with quicklime to sow with the drill. Top-dress with artificial manures young wheats, barleys, and clovers; soot and salt, malt coombs, rape-dust, nitrate of soda, and gypsum, about 1 to 1½ cwt. per acre. Lay composts on grass lands, and spread immediately; pick off stones, and bush-harrow and roll. Sow cabbage seeds for summer plants.

Hops may now be planted on dry deep loams, trenched and well prepared, the hills six feet distant each way; use rotten dung, and put four sets one in each corner, got from nursery beds, or from dressings; cover up lightly.

Spread mole-hills and set traps. Watered meadows will now be ready for the first feeding by sheep; heavy stock would damage the land in a damp state.

Planting of trees and of young hedges may be done this month, but not later; dry weather often defeats them; cutting of underwood must also be finished.

In wet weather thrash grain for fresh straw for the cattle yards; cart manure to the heaps in the fields, increase composts, and prepare artificial dressings. All turnips must be removed from the fields early in this month.

Stir fallows for green crops, and for summer working; finish laying composts on grass lands, and shut up for hay or pasture.

During this month ewes will begin to drop lamb; a sheltered paddock will receive the earliest in season, and on large farms a range of sheds will be required to confine and shelter the ewes and lambs till grown strong to go to the pastures that are sheltered and dry or watered. These accommodations are essential at this critical season, and an ample supply of juicy food in the fields and paddocks for the ewes. Litter the sheds often, and keep them well dry.

Stall-fed bullocks will now be ready for sale; begin to dispose of the first ready, and increase the food to the others, as the long days require a greater supply. Sell off bacon hogs for curing, and keep the after-farrows for store pigs. Set all kinds of poultry on eggs for hatching; exchange eggs with any good or better breed; feed well, and attend to cleanliness and warmth.

AGRICULTURAL QUERIES.

TO THE EDITOR OF THE MARK-LANE EXPRESS.

SIR,—Could you or any of your numerous correspondents inform me whether there be any law existing which prevents a man turning his bull to pasture; or, in point of fact, what is the remedy, provided you find your neighbour's bull with your cows? I have a small herd of very choice short-horns, got together at a very great expense; and as I think strongly on crossing them with the purest blood, it is a source of great anxiety the keeping them without contamination. I have also a neighbour whom no persuasion or remuneration will induce to keep his bull tied up; and I was positively obliged to have a person with my cows all last summer to prevent his intrusion. A neighbour of mine, a large grazier, to whom it is of the greatest consequence, has suffered repeatedly from the same cause. If there be no law there ought to be one to prevent such wrong-headedness. Your reply would greatly oblige A BREEDER OF THE RIGHT SORT.

Weston super-Mare, Feb. 14.

N.B. Pray use your influence in remedying this evil.

SWEDES *versus* BEANS.

SIR,—Please to tell me which crop pays best on a heavy land farm, swedes 20 tons per acre, or beans 40 bushels per acre? Some of my neighbours tell me that the beans ground into flour will form more meat than the swedes. If so, are we not wrong in growing roots; and ought we not to keep to the good old-fashioned farming?

Your obedient servant,
DUBIOUS.

SIR,—The farmers who belong to the news-room here will be obliged by your informing them, through the medium of your paper, if a fair or average crop of potatoes can be grown with 3 cwt. of guano per acre, without any other manure. The land is dry, but not in very high condition.

Yours truly,
G. D.

Glamorganshire, Feb. 13.

SIR,—Having the charge of a large Southdown ewe flock, amounting to a thousand, which I keep in two lots of five hundred each, and which I am unfortunate enough to have a good many sliping (casting) their lambs, I should be glad if, through your journal, I could trace it to any cause which I may be able to remedy for the future. I shall, therefore, in describing their treatment, designate them as lot 1 and lot 2. Both lots, from the time the rams were put, to the 14th Sept., were grazed during the day in as fine a sound park as any in England, and went to fold upon Italian grass at night until November; after which they were folded at night upon a few turnips and hay until the middle of December, when their run-out at days was of short duration. Up to Christmas they were in the same field, and all went well.

The field being fed off, I sent lot 2 to a good distance away to green-top turnips, and lot 1 to green-tops and swedes the field adjoining where both lots had been together, both lots getting the same hay. About the first week in January, lot 1 began casting their lambs, and continue to do so, while I have only had one in lot 2.

Some have lambs not half gone, while others are within a fortnight of their time. The ewes do not show the usual sign of abortion, except as to appetite and coat.

Is there any herb or shrub which, if mischievously thrown to a flock, they would eat, and thereby cause abortion to a large extent?

Should any of your readers be able to throw any light upon the subject, I shall feel obliged,

And remain, your obedient servant,

Oxon, Feb. 7. A. B. C.

SIR,—I should be obliged if you or any of your numerous readers can give me information on the cultivation of chicory, and its preparation for the market, and especially on the following points:—1. Quantity of seed per acre. 2. Time and manner of sowing. 3. After-cultivation. 4. Whether the root acquires a sufficient size in the first year to fit it for market. 5. No. of tons per acre of an average crop. 6. Quality of soil preferred. 7. Whether there is any advantage or the contrary in allowing the roots to stand more than one year year before gathering. 8. Time and methods of preparation for the market.

Truly yours,

A YOUNG FARMER & SUBSCRIBER.

DEAR SIR,—Yours being a real farmers' paper, I shall be much obliged if you will decide the following question, which you will perceive materially affects your readers.—Mr. A has a flock of sheep; and Mr. B, a neighbour of his, has a dog, who is seen to go to the said flock and worry several of the sheep. The owner of the dog, on receiving notice of the damage, destroys the said dog. Is he liable to pay A for the damage or loss of the sheep? An answer in your next will oblige. E. T.

Boston, Feb. 5th, 1855.

SIR,—Will any of your numerous correspondents inform me what is about the value of good linseed straw in its raw state; and where I could find a market?

I am, Sir, yours truly,

AN OLD SUBSCRIBER.

SIR,—I am about dividing by means of posts and rails some large grass fields, for the more convenient grasing of sheep and cattle. The posts will be mortised, and the rails 3½ inches wide and about 2 inches thick, roughly sawn out, and the whole made of larch, which I am now felling. I should feel much obliged if either of your many correspondents would inform me of a good, cheap, and easy mode of pickling or treating such posts and rails, to prevent as far as possible decay or rot by exposure to a damp climate, and for preserving to the ends of the posts that will be put into the ground.

I am, sir, your most obedient servant, H. L.

DEAR SIR,—You will oblige me by answering the two following questions:—What is the greatest weight of a pig ever fed? and when was the war in Spain ended in which Sir De Lacy Evans was connected?

I am, dear sir, yours truly,

Kingston, Jan 26. AN OLD SUBSCRIBER.

SIR,—Will any of your correspondents be so good as to inform "A Young Farmer" what is the best mixture to use with guano, and whether common coarse or bay salt would not be much better and more fertilizing than ashes or sand or clay?

Jan. 22.

A Canadian subscriber says:—"Could any of your numerous correspondents inform us as to the cheapest and most suitable substance applicable as a silicious manure to wheat and potatoes, in absence of your correspondent's clinkers?"

ANSWERS TO AGRICULTURAL QUERIES.

GUANO AND SALT.—CLINKERS FOR POTATOES.

The admixture of salt with guano, weight for weight, I have long recommended for strengthening the rapid juicy vegetation, and checking the tendency to rot where it exists. For this the refuse pilchard salt (full of oil and animal matter) is the best; and any animal-foul refuse salt, as that from foreign hides, &c., is so much better than new or clean salt. But the mixture should still be reduced, by an additional quantity of dry earth or ashes, if for drilling in with the seed. For clinkers, ashes are the most direct substitute, being in fact the same thing, only not melted, and therefore the more soluble of the two. I have seen a potato plot dressed with coal ashes free from disease, while those all round were infected; some in the worst degree. J. PRIDEAUX.

SIR,—In answer to your correspondent "H. L," I beg to inform him that I have put up very successfully long lengths of post and rail, for the purpose of dividing pastures for grazing stock, consisting of larch posts, split in two, and mortised as he describes, with larch rails, also split; and I have used a mixture, Stockholm and gas tar, in equal quantities, put on hot, having a portable copper to boil it in. I would further recommend him to char, that is, burn the ends of the posts before putting them in the ground, which prevents decay. Digging a small trench on each side the fence, about 15 inches wide and 15 to 18 inches deep, prevents stock breaking the rails.

Your very obedient servant.

Feb. 7th, 1855. A SUFFOLK MAN.

CLOVER-SICK LAND.—SIR,—Unable to answer your correspondent's inquiry in the case of gravelly loam; on a light loam, of middling quality, upon slate, I found the following mixture, top-dressed in spring, bring up a rich dense mat of deep green clover, when that of the other fields on the estate was thin and pale:—(The receipt I sent to your columns on a former occasion, but it may not have met your correspondent's eye.)—For five acres: Nitrate of soda, 3 cwt.; gypsum, 5 cwt.; wood ashes, 1 ton. This was near the sea. Inland, it would probably be improved by the addition of 3 cwt. of salt. And, where wood ashes cannot be obtained, 4 cwt. of salt, and 8 cwt. of slaked lime (well mixed, damp, and heaped together for two or three weeks previously), may be substituted, but not with equal effect.

Jan. 23. J. PRIDEAUX.

The greatest weight of a Lancashire pig that I am aware of on record was in February, 1852, when Mr. Peter Wright, farmer, of Maudsley, slaughtered a fat pig, of his own breeding and feeding, of the improved prick-eared breed, of the following dimension:—Length 8 ft. 8 in., girth 7 ft. 10 in., height 3 ft. 7 in., and weighed 52 scores 8 lbs. The head weighed 64 lbs. M. SAUL.

Garstang, Feb. 8th, 1855.

"ACCEPTED, WITH THANKS,

The following prizes, from Robert Ferguson, Esq., Mayor of Carlisle—two pieces of plate, one of the value of £40 for the best thorough-bred stallion; and another of the value of £30 for the best coaching stallion."—*February Monthly Council Meeting of the Royal Agricultural Society of England.*

Ye farmers who'd a hunter breed,
 To ride him or to sell,
Remember, as your greatest need,
 That "blood is sure to tell."

But Council cannot aid you here—
 To get the best of crosses,
At Carlisle, as in Lincolnshire,
 We've *Mayors* to "thank" for horses!

H. C.

OXFORD FARMERS' CLUB.—The usual monthly meeting of this club took place on Wednesday last, at the Maidenhead Hotel. There was an unusually large attendance. The sum of 5*l.* was voted, to be offered as a prize for the best essay on "The great practical benefits which result to the public in general, and to the agriculturists in particular, from Farmers' Clubs and other Agricultural Associations." The essays must be sent in to the secretary ten days prior to the April meeting.

METEOROLOGICAL DIARY.

BAROMETER.			THERMOMETER.			WIND AND STATE.		ATMOSPHERE.			WEAT'R.
1855.	8 a.m. in. cts.	10p.m. in. cts.	Min.	Max.	10p.m.	Direction.	Force.	8 a.m.	2 p.m.	10p.m.	
Jan. 22	29.74	29.84	22	32	25	S.W., S.S.W.	gentle	cloudy	cloudy	fine	snow
23	29.85	29.92	25	32	29	S. and Easterly	calm	cloudy	cloudy	cloudy	dry
24	29.96	30.00	29	32	32	North	calm	cloudy	cloudy	cloudy	dry
25	30.02	30.02	29	34	33	N. West	gentle	cloudy	cloudy	cloudy	dry
26	30.02	29.91	28	36	32	West or by S.	gentle	cloudy	cloudy	cloudy	dry
27	29.92	29.95	26	36	22	N. East	gentle	fine	sun	fine	dry
28	29.95	29.89	22	34	29	Various	calm	haze	cloudy	cloudy	snow
29	29.74	29.66	25	33	29	Various	calm	fine	fine	haze	dry
30	29.68	29.68	28	32	30	East	fresh	cloudy	cloudy	cloudy	snow
31	29.52	29.44	27	29	28	East	strong	cloudy	cloudy	cloudy	snow
Feb. 1	29.77	29.98	27	31	27	N. East	gentle	fine	sun	fine	dry
2	29.99	29.79	24	29	27	East by North	forcibl.	cloudy	cloudy	cloudy	dry
3	29.49	29.48	27	39	38	S. S. E.	gentle	cloudy	sun	fine	showery
4	29.41	29.28	33	37	35	Various	calm	haze	fog	fog	showery
5	29.26	29.36	33	36	34	Various	calm	haze	fog	fog	dry
6	29.37	29.58	33	35	33	N. East	various	cloudy	cloudy	cloudy	sleet
7	29.72	29.83	31	33	30	N. East	lively	cloudy	cloudy	cloudy	dry
8	29.81	29.66	28	32	30	East	strong	cloudy	cloudy	cloudy	snow
9	29.84	29.87	28	30	28	N.-Easterly	brisk	cloudy	cloudy	cloudy	dry
10	29.86	29.78	19	32	19	E. by North	gentle	fine	sun	fine	dry
11	29.61	29.49	12	33	29	Northerly, Var.	gentle	fine	sun	cloudy	dry
12	29.49	29.44	23	36	27	N. East	brisk	fine	sun	cloudy	dry
13	29.44	29.36	24	33	24	N. East	brisk	fine	sun	cloudy	snow
14	29.36	29.38	14	31	27	North	gentle	fine	sun	cloudy	dry
15	29.65	29.92	21	31	18½	N. by West	calm	fine	sun	clear	dry
16	29.92	29.80	16	32	23	Easterly	various	fine	sun	cloudy	snow
17	29.80	29.90	20	31	18	Easterly	n. calm	cloudy	sun	clear	rime
18	29.99	29.89	12	34	17	Easterly	gentle	fine	sun	clear	dry
19	29.99	29.88	11	32	27	Easterly	fresh	haze	sun	clear	dry
20	29.73	29.70	20	35	21	N. East	fresh	fine	sun	fine	dry

ESTIMATED AVERAGES OF FEBRUARY.

Barometer.		Thermometer.		
Highest	Lowest.	High.	Low.	Mean.
30.82	29.17	53	21	38

REAL AVERAGE TEMPERATURE OF THE PERIOD.

Highest.	Lowest.	Mean.
34.28	24.75	29.525

WEATHER AND PHENOMENA.

Jan. 22 to 26. A period of gloom or fog; snow on the 23rd.—27. Fine and sunny.—28. Haze and overcast.—29. Fine, without much sun; dense yellow fog.—30. Much snow.—31. Same; forcible driving east wind.

LUNATION.—Jan. 25th, first quarter, 1 h. 39 m. morning.

Feb. 1. Fine.—2. Overcast; driving wind.—3. Heavy morning shower, freezing on windows; thaw followed.—4 and 5. Dense yellow fog.—Damp almost to saturation.—7. Very cold.—8 and 9. Immense snow, drifting.—10. Bright.—11. Still fine; very keen frost.—12. Warmer; fine day; overcast night.—13. Some snow; cold current.—14 and 15. Fine, and quiet.—16. Rime on all trees.—17. Fine.—18. Extreme cold; powerful sun.—19. Variable.—20. Again brilliant; heat of sun at 2 p.m., 51 deg.

LUNATIONS.—Full Moon, Feb. 2, 3 h. 41 m morning. Last quarter, 10th day, 3 h. morning. New Moon, 16th day, 6 h. 48 m. p.m.

REMARKS CONNECTED WITH AGRICULTURE.

The snow, deeply drifted in places, remains on the surface everywhere, guarding the crops. We cannot retrace a snow so durable since 1814. Most persons rejoice in this healthy and seasonable weather. Some snow-water has entered the ground, but not to the depth of one inch. We trust that Providence now favours the country with a promise of another propitious harvest.

Croydon, Feb. 21. J. TOWERS.

AGRICULTURAL REPORTS.

GENERAL AGRICULTURAL REPORT FOR FEBRUARY.

Owing to the extreme severity of the weather, most farm labours in all parts of the United Kingdom have been in a state of abeyance during the month just concluded; and the heavy falls of snow have rendered it necessary to prepare additional in-door accommodation for fattening stock. Although both ploughing and sowing have been wholly suspended, and although it has been found impossible even to cart out manure in any quantity, it is satisfactory to know that all agricultural labours are sufficiently forward, from the fineness of last autumn, and that farmers generally are well satisfied, not only with their present position, but likewise with future prospects. The high prices obtained for grain, more especially for wheat, during the last twelve months—the limited chances of any material decline in them for a considerable period —and the steady demand for home produce—have naturally induced the agricultural body to keep their attention well directed to an increased production in future. The same exertions which we noticed last season have been directed to obtain the same result this; and we have no hesitation in saying that even a larger breadth of land is now under heavy wheat culture than at the corresponding period in 1854. Then, it will be recollected, the extent was larger than had ever been recollected, and the result of the harvest, both as regards quantity and quality, and the actual profits since realized (steadier perhaps than during the ten previous years) have fully justified the growers in their exertions to produce a good and, we hope) profitable crop this season. Present appearances indicate that these exertions will prove successful; but the amount of pecuniary profit must depend upon the course which the present war with Russia is likely to take, and the extent of the importations from that country and other parts of the globe. A declaration of war on the part of Austria, and the destruction of Sebastopol, will possibly induce the Czar to open his eyes to his present position, and treat fairly with his opponents; but even a notification of peace, though it would immediately reduce the value of wheat in this country, would not bring us supplies from Russia for several months; and, as America has little or nothing to spare for shipment in the shape of wheat or flour, it is scarcely possible that we shall have an increasing stock of foreign food in this country for a considerable period. There has, judging from the weekly returns of sales, been a continuous, and we may add active, demand for home-grown wheats since the close of last harvest, and there must consequently have been large inroads made upon the aggregate produce; nevertheless we are inclined to the opinion that the supply still on hand is much larger than many parties imagine — that is to say, if the growth was of that fine and extraordinary character which we have been led to expect. And here a point of considerable importance, in this age of statistical inquiry, presents itself. For many years we have been favoured with imaginary statistics of the yield of the various kinds of produce in this country, and some of those statistics have given the annual average of wheat at 30,000,000 quarters. Evidently, this is a ridiculous absurdity. There never were 15,000,000 quarters grown in England; and if there were, what becomes of even that quantity? Let us take as our guide, to some extent, the inspectors' returns. On the average of weeks, they do not show 100,000 quarters as the sales each week; and if we add another 100,000 quarters as the barn-door or private transactions, it will be found that we are unable to trace more than 5,400,000 quarters as the actual quantities changing hands in each year. Within the month, the agricultural statistics, under the auspices of Government, have been presented to the public as regards Scotland, and from them we find a vast difference between the estimated growth of wheat and the actual quantity grown. Prior to these statistics being issued, we were informed that the yield of wheat in Scotland was 1,225,000 quarters; but the official returns give the quantity at only 606,063 quarters. The estimates of other crops have proved equally fallacious, and we have no doubt but that similar returns for England would show similar results.

As regards the state of the corn trade, we may observe that it has proved extremely dull from various causes. In the first place, it may be intimated that, from the vast numbers of persons thrown out of employment by the severe weather, the consumption of bread has been materially lessened; and in the second, that the frozen state of the lands has prevented the transmission of grain to market, especially to a distance; whilst numerous mills worked by water-power have ceased working. The consequence has been that millers have been compelled to cease buying, and that consumption has been almost wholly met by stocks of flour on hand. There has, however, been no material change in the quotations, yet they certainly have had a downward tendency. The demand for all spring corn has continued heavy, and the quotations have ruled in favour of buyers. The stocks of foreign food at this time in the United Kingdom are smaller than for many years past.

From several of our stock-districts, complaints of the scarcity of winter food has reached us; and we are informed that the quality of the turnip and carrot-crops has not proved very fine; yet it is satisfactory to note that a great improvement has taken place in the general weight and condition of the beasts and sheep shown in Smithfield and in the other large consuming markets in the kingdom. Their numbers have not increased upon us; but any deficiency in this respect has been amply made good by the comparatively large amount of food which the animals have yielded on being slaughtered, and the increase in the quantity of rough fat has, in a measure, made us nearly independent of any supply of foreign tallow. This increase has led to a serious decline in the value of both articles—rough fat having fallen to 3s. per 8lbs., and Russia candle from £7 to 56s. per cwt.

The continuous decline in the value of English wool is a matter of serious import. At the present time, fine wools may be purchased as low as 1s. per lb., and even at that price great difficulty is experienced in finding purchasers. The colonial wool sales now in progress have been fairly attended, yet the quotations have given way 1d. per lb. At this depression we are not surprised, seeing that a great decline has taken place in our export trade in woollens, and that supplies of wool from Australia and the Cape have been as large under the difficulties of obtaining adequate supplies of labour in the colonies as they were prior to the gold-finding mania setting in. The fact that we shall shortly have large additional supplies of home-grown wool on sale leads us to the conclusion that any revival in the trade by which prices may be enhanced is out of the question. Had it not been that several rather large parcels have of late been taken off for shipment to Belgium, no doubt can be entertained but that prices would be much lower than they are now.

There has been only a moderate demand for both hay and straw; yet prices, from the limited quantities offering, have had an upward tendency. The supplies on hand are still very extensive; but the quality of the meadow hay is by no means prime.

The consumption of potatoes has been well met by the supplies, though they have not increased. From the most reliable sources, we find that heavy stocks are still on hand in good condition. It is now proved beyond a doubt that the growth of 1854 was an unusually large one; and this must be apparent, when we state that not more than about 100 tons of foreign potatoes have arrived in the metropolis since the close of last September. The quotations have varied from 70s. to 120s. per ton.

REVIEW OF THE CATTLE TRADE DURING THE PAST MONTH.

Since we last wrote there have been no important changes in the value of either beasts or sheep in Smithfield or elsewhere. The supplies, though moderate in number, have proved in excellent condition, and have yielded a much larger amount of food than in many previous months. This is a most important feature in the trade at this moment, because it must have the effect of keeping prices steady, and of preventing that wholesale drain of half-fat animals from the pastures which has not unfrequently led to great and unnecessary fluctuations in price. In the event of future supplies being equal to those shown during the month just concluded, there will be less occasion to import largely from the continent, and we shall be placed in possession of nearly an adequate supply of rough fat to meet the demands of the tallow-melters, and thereby render ourselves independent of Russia for a supply of tallow. Prices have continued very remunerative, even taking into consideration the enhanced rates paid for lean stock in the spring of 1854; but evidently there has been a great falling off in the consumption, arising from the immense number of labourers thrown out of employment from the severe weather, and the great decline in our export trade. Short time has been the order of the day in the large manufacturing towns, and until matters improve in this respect comparative inactivity in the meat trade must be expected.

The closing of the shipping ports in Holland has led to a great falling off in the importations of live stock. Only two ports are now open, viz., Ostend and Harlingen, and a very limited supply is expected during the present month. Our consumption will, therefore, be almost wholly met by home stock. The following supplies have come to hand since our last:—

	Head.
Beasts	1,508
Sheep	683
Calves	648
Total	2,839
Corresponding month in 1854	10,683
— 1853	12,433
— 1852	9,123
— 1851	11,826
— 1850	3,880

About 550 of the beasts reported above were received from Spain. Whilst on the subject of the transmission of stock by sea, we may notice the numerous losses which have lately taken place. As those losses have been wholly caused by the want of proper protection for the animals, it surely becomes necessary that some means should be devised to prevent a recurrence of the evil. Of the 648 calves above noticed, more than 100 have died on passage, or shortly after being landed, from exposure. Vessels, to carry stock, ought to be properly fitted up for the trade; in other words, some kind of shelter from the inclemency of the weather ought to be afforded them. We have seen calves arrive from Ostend literally covered with a coating of ice several inches in thickness, and in a condition which rendered it necessary either to kill them at a great loss, or throw them overboard. The Scotch cattle conveyed by sea have fared no better; but we advise all shippers not to forward their stock in vessels which do not afford proper accommodation. This determination, if generally carried out, would speedily arrest the evil of which we now complain.

The total supplies of stock exhibited in Smithfield have been as under :—

	Head.
Beasts	17,436
Cows	385
Sheep	91,180
Calves	586
Pigs	2,705

COMPARISON OF SUPPLIES.

	1851. Feb.	1852. Feb.	1853. Feb.	1854. Feb.
Beasts	17,393	18,797	19,308	20,091
Cows	324	433	470	520
Sheep	91,568	95,306	86,910	92,441
Calves	1,381	1,503	2,098	1,028
Pigs	2,340	2,439	2,420	2,279

The home bullock supplies have been thus derived.—

	Head.
Norfolk, Suffolk, &c.	8,800
Other parts of England	1,550
Scotland	1,072

PER 8LBS. TO SINK THE OFFALS.

	s.	d.		s.	d.
Beef has sold at from	3	0	to	4	10
Mutton	3	0	to	5	0
Veal	4	0	to	6	0
Pork	3	0	to	4	4

COMPARISON OF PRICES.

	Feb. 1851.					Feb. 1852.				
	s.	d.		s.	d.	s.	d.		s.	d.
Beef ..from	2	4	to	3	8	2	2	to	3	8
Mutton	3	4		4	6	2	8		4	4
Veal	3	0		4	0	3	0		4	2
Pork	2	10		4	0	2	6		3	10

	Feb. 1853.				Feb. 1854.			
	s.	d.	s.	d	s.	d.	s.	d.
Beef ..from	2	8	4	2	3	2	4	10
Mutton	3	10	5	2	3	0	5	2
Veal	3	2	4	10	3	6	6	0
Pork	2	10	4	0	3	4	4	10

We regret to find that some graziers have forwarded their sheep to London denuded of their wool. Evidently this is a bad and a most injurious system; and did they but consider the loss which they sustain by it, they would at once abandon shearing in anything-like inclement weather. It frequently happens that clipped sheep stand in the market till nearly its close before buyers can be found for them, and then they are parted with at a comparatively low rate compared with those in the wool.

The low value of English wool has been followed by a great decline in the price of skins, it being now nearly 3s. per skin less than at the same time in 1854.

Newgate and Leadenhall have been well supplied with each kind of meat, yet the demand has ruled heavy, as follows: — Beef, from 3s. to 4s. 4d.; mutton, 3s. 2d. to 4s. 4d.; veal, 3s. 10d. to 5s. 4d.; and pork, 3s. to 4s. 6d. per 8lbs. by the carcass.

ASHBOURN FAIR was very moderately supplied with horses, either as regards number or quality; good ones were well sold, while in other sorts there was a flat sale. The cattle fair was not so largely supplied with store cattle as we have witnessed, yet sales were heavy, and lower prices had to be submitted to. A few fat beasts were on sale, and were in request, and well sold; but few pens of fat sheep, and most would be sold. Beef made about 6½d., sheep 7d. to 7½d.

BARNSLEY FAIR was very dull, and comparatively speaking, nothing done. High prices were asked for cows. There were a few good horses, but not many sales effected. There was not a great many pigs; two or three, however, were famous for show, weighing from 40 to 45 stones each. These were only in character with the whole—more show than sale.

BEDALE FORTNIGHT FAIR.—We had a moderate supply of fat stock, which moved off slowly, at a slight reduction in price, though scarcely quotable. In-calving cows could not be sold at the high rates prevailing. Lean stock sells readily at late prices. Beef, 6s. 6d. to 7s. 3d. per stone; mutton, 5d. to 6d. per lb.

CHESTER FAIR.—The supplies were limited, owing to the severity of the weather. Of fat cattle very little was shown, and the price was somewhat lower, realizing 6½d. Milking cows were in good demand, but not many shown. There was a tolerable inquiry for lean stock at the usual prices. Sheep fetched 7d. to 7½d. Pigs were a little higher in price than at last fair. Light horses were in demand, as also good ones of any kind, for which good prices were realised. A good show of cart-horses, with brisk sale.

COCKERMOUTH FAIR.—The show of horses was exceedingly large, much larger than was ever known; buyers were also very numerous; but sales were slowly effected, owing to the high prices asked by the sellers.

CRICKLADE MONTHLY MARKET was the largest that has yet occurred, both as regards the attendance of farmers and dealers and the supply of cattle. The streets were literally thronged, and it was considered that there could not be less than 1,000 head of cattle. The supply of beef was excellent and good, and several splendid herds of heifers and grazers. There was also a good supply of sheep of various kinds, and the trade was brisk and satisfactory.

EXETER FAIR.—In consequence of the severity of the weather, the attendance of dealers was small, and the supply of cattle was exceedingly slack. Business was dull, and there was a general complaint among the dealers that scarcely anything was doing. The quotations were—for fat beef, from 10s. to 10s. 6d. per score; working oxen, £14 to £18; cows and calves, £12 to £14 14s.; steers, £8 to £12 each; barreners, 6s. 6d. per score. There were very few sheep in the market, which sold at from 6d. to 6½d. per lb.

REVIEW OF THE CORN TRADE

DURING THE MONTH OF FEBRUARY.

During the month of February the trade in grain has been materially interfered with by the severity of the weather, and there has been, on the whole, greater dulness than generally looked for—traceable, we fear, to the great want of employment in all the manufacturing districts, as well as to a falling off in general trade at the large towns of the United Kingdom. In the metropolis a complete check to building has taken place, and every branch connected therewith has suffered, reducing the consumption of all articles; and, from the non-arrival of the usual number of vessels, an immense number of labourers at the various docks have been thrown out of employment — able-bodied men, willing to work if it could be obtained.

The farmers have had an opportunity of thrashing more freely, and the deliveries increased the first week of the month considerably, being 91,223 qrs. wheat at 70s. 11d., against 64,203 qrs. at 69s. 9d. the last week in January, showing a difference of 27,020 qrs., the price giving some little encouragement, having advanced 1s. 2d. per qr. on the average.

In our last review we stated that negociations were about to be commenced at Vienna between the Western Powers and the Emperor of Russia, but which have hitherto made little progress; and although Lord John Russell has been appointed special Plenipotentiary from England, there is much misgiving in this country that nothing towards peace will be done by discussions, and that every exertion must be continued to bring war to an end by hard fighting; and on the part of Russia this is very evident, as the Czar has issued a manifesto, in which he calls the entire population under arms, from which an additional force of 300,000 men will be despatched to the Crimea. The Western Powers, therefore, have their work of war now set out; and if nothing be accomplished as to the downfall of Sebastopol soon, it seems doubtful whether anything can be done against so overwhelming a force appointed to march to the Crimea. In this position of matters, how can we look for supplies of grain from the Black Sea? And although the blockade of the Danube is now reported as likely to be raised, neutral vessels must be employed to load at Ibraila and Galatz, and these will have to pass the Russian forts on the banks of that river in Bessarabia; and it will be seen whether grain is so soon parted with by that Power. Besides, the Sulina mouth is generally supposed to have many impediments, and not a sufficient depth of water for good-sized vessels getting out.

At the first Monday's market of the month the supply of English wheat at Mark Lane was short, and the millers took it off steadily at fully the rates of the previous week. The London average registered 74s. 6d. per qr. on 3,558 qrs., although considerably more than this quantity was sold; the merchants selling for delivery by the various railways seldom make any return—these are mainly the sales effected by the Essex and Kentish factors. The imports of foreign wheat were very liberal, and it may be of interest to name from whence they came. There were 10,012 qrs. from Rostock, principally of last year's crop, and this growth is nothing near of so fine quality as previous years. 4,171 qrs. from Danzig, and amongst this some very superior red, as small a berry as the old Burwell; it has a transparent skin, much esteemed by our town millers, and this was sold at 86s. per qr., weighing about 63lbs. per bushel: whilst some fine old high-mixed commanded 88s. to 90s. per qr. From Hamburg there were 820 qrs., consisting of useful qualities of red; from Stralsund, 3,330 qrs. of good millers' descriptions; from Stockholm, 300 qrs. (this is a favourite quality, and commanded a good price); from New York, 1,250 qrs.; and from bond, 1,015 qrs.: making a total of 22,383 qrs. against 13,906 qrs. the corresponding week of last year.

There was again a short supply of English wheat on the second Monday of the month at Mark Lane; and the rigours of winter having been experienced, and drift ice accumulating in the Thames, the millers bought very sparingly, and took off only a few parcels of white, at about previous rates; other sorts were not pressingly offered, but sales could only have been effected by submitting to a reduction of 1s. to 2s. per qr. This, however, the factors refused to comply with, the more so as there appeared every prospect of the navigation being closed, and purchases could not be worked in that case. The London average registered 76s. on 4,015 qrs. The imports of foreign had greatly fallen off, and consisted of 1,530 qrs. from Dansig, 1,370 qrs. from Greifswald, 444 qrs. from Harlingen, 993 qrs. from Stettin, and 1,260 qrs. from Stralsund; making a total of 5,597 qrs. The transactions in all descriptions were unimportant, and prices much the same as the previous week; and as nearly the whole of the Baltic fleet, and the vessels from the north of Europe, may be considered to have arrived, no additional imports of any moment can be expected until spring shipments can be made, and that does not promise to be early this year; and it must be borne in mind that, as the weather remained mild up to a late period, a greater quantity was shipped of last crop than is generally expected.

At the third Monday's market in Mark-lane business on the river was entirely suspended, the navigation being completely stopped by the great accumulation of ice, and but for the spring tides floating it up and down, it would have extended from shore to shore. Vessels were moored alongside the wharves, and until the weather changed, the demand for grain was confined to that which could be delivered from granary, or by the various railways. Fine wheat, coming by the latter conveyance, met a tolerably good sale to our town millers; choice rough chaff commanded 78s. to 80s. per qr.; fine heavy-mixed samples, 74s. to 75s., and even 76s. per qr.; whilst 63lbs. red realized 70s. per qr.; and the demand was mostly confined to these fine descriptions. The London average registered 71s. 9d. on 2,099 qrs. The imports of foreign were quite trifling, there being only 443 qrs. from Harlingen, and 480 qrs. from Konigsberg, and prices were without the least variation: the arrivals of foreign the corresponding week of last year were 17,533 qrs.

The quantity of English wheat brought forward at Mark-lane the fourth Monday was moderate, and the town millers purchased a fair quantity to be delivered by the railways, and from the Essex barges and Kentish hoys, which was ready for being worked now that the river is becoming freer of ice by the nice thaw since Friday. The imports were very limited of foreign, and not much was passing therein. The heavy fall of snow on Friday, the 23rd inst., softened the air, the wind veered round to the north-west, and on Saturday a steady thaw set in, with the wind at south south-west. The London average registered 73s. 7d., on 2,684 qrs.

The deliveries of the month have been much the same as those of the previous month; but the prices have on the whole been lower, and markets generally of a duller character, scarcely one really brisk day having been experienced, notwithstanding a general opinion prevailed that improvement would take place, and the severity of the weather continued to give hopes from week to week; but every description of buyer has appeared determined to keep his stocks down—merchant, miller, dealer, and baker, all alike were determined to buy only for immediate use, and the stocks held are mostly in the hands of the farmers, little in those of the trade. The quantity of wheat returned the first week was 93,879 qrs., at 70s. 11d.; the second, 91,223 qrs., at 71s. 1d.; the third, 85,873 qrs., at 70s. 3d.; the fourth not published in time for this periodical. The corresponding weeks of last year were 77,098 qrs., at 82s. 8d., the first week; 64,131 qrs., at 82s. 4d., the second; 59,170 qrs., at 80s. 1d., the third; and 55,662 qrs., at 78s. 5d. per qr. Then the stocks of foreign were large at most ports, and we were not at war; now the stocks are extremely light, and we *are* at war. Such is the uncertainty of the corn trade, that when there are data for high prices, they do not come, and when there is no ostensible cause, we get them. Certainly, this year, statistics and trade do not work kindly together at all: opinion, however, often rules the day; but, apparently, this is a year of exceptions to that rule.

There have been few changes in the article of barley throughout the month. The deliveries have been fairly kept up, and the markets have exhibited much dulness; the best Chevalier qualities still bringing 34s. to 35s. per qr. from our ale brewers, who appear determined to keep up their quality of the manufactured article, in spite of the great falling off in the consumption. Intermediate qualities have not supported prices so well, and those adapted for the distillers have been reduced 1s. to 2s. per qr., enabling them to put down the price of gin 2d. per gallon; giving, indeed, a slight reduction, compared with that of the raw article. Grinding samples have given way about as much; and although this article is lower than any other, yet it is the most difficult to sell, and no one has spirit to hold any stock of it beyond what is required for immediate use. The importations of foreign have been of the most trivial character, there being few cargoes amongst the northern fleet, and now no prospect of any more coming forward until spring shipments can be made. Our farmers will have an opportunity of supplying the entire demand for some time to come, and are no doubt using much themselves, during the present severity of the weather, for their own cattle.

The quantity returned on the 3rd inst. was 94,250 qrs., at 32s. 2d.; that for the week ending the 10th, 91,370 qrs., at 32s. 6d.; and there were sold for the week ending the 17th, 79,759 qrs., at 31s. 9d.; the last week in January was only 83,228 qrs., at 32s. 2d. A portion continues to be used for horses throughout the metropolis, with a favourable result. It is rather surprising that monied men do not take this article as a good investment; the Dutch distillers will want it as soon as the frost has disappeared from Holland.

The first week of the month the supplies of oats were liberal, amounting to 38,480 qrs. of all descriptions, whereof 10,636 qrs. were from Ireland, and 21,983 qrs. from foreign ports, very few coastwise, and the remainder by the Eastern Counties and Great Northern Railways. Prices were tolerably well maintained; but there was no great life in the demand for any description; and the next week there was a great falling off in the supplies—269 qrs. by coasting vessels, 213 qrs. from Scotland, 50 qrs. from Ireland, and 135 qrs. foreign, making only 667 qrs. by water; whilst 2,921 qrs. came by the Eastern Counties, and 2,031 qrs. by the Great Northern Railway. With these small arrivals, however, no advance could be established, and only a moderate amount of business was transacted. The week following there were 3,673 qrs. from Scotland, and 3,085 qrs. from Ireland, besides 44 qrs. coastwise, 250 qrs. foreign, 2,687 qrs. by Eastern Counties, and 2,361 qrs. by the Great Northern; but as the river was so full of ice, sales could not be effected from on board ship. The demand was limited to small quantities for immediate use from granary, and for which no improvement in value could be established: it has been thus with this, as with every other article, throughout the month—one continued dulness; and every description of buyer appeared determined to purchase no more than was wanted for immediate consumption. The stocks in the hands of the factors are however much reduced, and those with the dealers are not large; but a considerable quantity is expected from Ireland with the first favourable wind, and as that has come on the 24th inst., we shall now not be long without them: no doubt they will be here by the time the river is clear of ice.

The deliveries of beans have been larger this month than last, and notwithstanding the severity of the weather prices have slightly given way, and the sales have been on the whole effected with languor. The imports of Egyptian have been to a moderate extent, and these have been rather more reduced in value than English, being only worth 37s. to 38s. per qr., with a slow dragging sale. The demand for seed samples has been much procrastinated by the wintry state of the weather, and planting this season seems likely to be very late. The melting of the snow went on freely the 24th instant, the sun having attained a good degree of power; and without rain, with the temperature prevalent after that date, it will not be long melting away, when spring tillage will be commenced in earnest, and the land no doubt well pulverised by the frost.

The article more difficult to understand than any other has been that of peas; for usually, in sharp frosty weather, not only has the demand been greatly increased, but an improvement in the price has been established. This winter a slow dragging trade has continued throughout the month, and prices have steadily declined, with even very moderate deliveries from the farmers, and limited imports of foreign: the stocks are, however, very low, and a large quantity has gone into consumption without being brought to market—for every purpose of feeding they have been used. Fine qualities of blue are scarce, and when a few samples appear they are taken for Scotland, the seedsmen wanting no more at present, having secured their various stocks early in the season. There is no prospect of any import of foreign for some time to come, and the demand for planting may throw a little life into the trade when once it has commenced.

The imports of foreign corn produce, published in the *London Gazette* of the 20th instant by the Board of Trade, show a total of 540,800 qrs. grain, and 130,620 cwts. flour, for the month ended the 5th inst.; against 449,274 qrs. grain, and 836,443 cwts. flour, in the corresponding month of last year. Of these, the three chief articles entered for home consumption, in the United Kingdom, amounted in the month ending

	Wheat. qrs.		Maize. qrs.		Flour. cwts.
5th Nov.					
1853	425,866		58,685		302,355
1854	75,517		41,732		29,066
Decrease	350,349		16,953		273,289
5th Dec.					
1853	411,128		46,714		294,212
1854	114,907		69,241		43,718
Decrease	296,221	Increase	22,527	Decrease	250,494
5th Jan.					
1854	341,398		40,971		249,085
1855	114,687		153,455		97,268
Decrease	226,711	Increase	112,484	Decrease	141,817
5th Feb.					
1854	297,489		98,648		836,443
1855	301,568		60,772		130,620
Increase	4,079	Decrease	37,876	Decrease	705,823
Decrease in 4 months	869,202	Increase	80,182	Decrease	1,371,423

And reducing the flour to wheat 391,835 at 392lbs. flour to 1 quarter of wheat.

Total decr. 1,261,835 quarters of wheat and flour combined since the 10th of October, 1854.

And we believe the imports for the two following months this year will show a much greater falling off than the above four months, and yet this great inactivity in trade continues.

From the United States our advices are up to the 6th February, when there was little change to notice in the value of breadstuffs. Prices continued to decline a few days after our last report; but under a falling off in the receipts, a better demand from the eastern ports, and the more favourable advices from Europe, a portion of the previous decline was recovered, especially for the better state brands. The New York market closed with firmness. In wheat there was no change to advise; the stocks on hand were very small, and as those in the interior were equally light, no activity in the demand can be looked for yet awhile, and little change in the value of fine samples can be expected. There has been an active demand for Indian corn for the eastern market, and prices have advanced. The stock of mixed western was very small, and being of the old crop was held for more money than white or yellow. The exports of breadstuffs from America from the 1st September,

	Flour.	Wheat.	Maize.
1854	98,859 brls.	203,478 bush.	3,376,062 bush.
1853	1,126,848	4,576,617	1,644,397

Of cornmeal the export was 2,776 brls. this year against 21,402 brls. last year.

The exports of breadstuffs for the week ending the 6th February were:—To Liverpool 13,095 brls. flour, 11,751 bush. wheat, 201,579 bush. Indian corn; to London, 1,992 brls. flour; to Bristol, 353 brls. flour; to Glasgow, 504 brls. flour; and 7,213 bush. Indian corn. The Indian corn ultimately finds its way to Ireland.

It will be of some interest to give here the quantities of foreign grain entered for consumption during the years 1853 and 1854, which stand thus:

	1853.	1855.
Wheat ....qrs.	4,951,310	3,468,746
Barley........................	828,670	560,818
Oats	1,035,072	1,029,305
Rye........................	76,700	5,926
Peas	101,774	111,054
Beans........................	350,401	388,111
Indian corn....................	1,552,934	1,358,380
Buckwheat....................	7,102	287
Bere or Bigg	964	607
Total grain ...	8,904,927	6,923,234
Flour ....cwts.	4,646,409	3,679,699
Barleymeal....................	51	75
Oatmeal....................	826	456
Ryemeal....................	19	2,842
Peameal....................	14	6
Indian cornmeal................	15,581	55,962
Buckwheat meal................	48	66
Total flour and meal ..	4,662,948	3,739,106

The following articles are interesting to agriculturists, being free of duty:—

	1853.	1854.
Guano imported ....tons	123,166	235,111
Potatoes..................cwts.	1,133,609	116,446
Cloverseed	214,695	141,114
Flaxseed and Linseed ......qrs.	1,085,885	827,714
Rapeseed	86,815	103,255
Tares....................	17,816	23,250

All parties interested in agriculture will examine what effect one of the severest winters has had on their wheat plant, extremely severe weather from the 15th January to the 24th February having been experienced. Fortunately a good coating of snow has accompanied the intense frosts, which will, no doubt, have given great protection to the plant; and on this account little fear has been excited. Usually, after so severe a winter good crops of this article have followed; and this year, above all others, it is to be devoutly wished for, as our exhausted stocks would tell a tale of woe if anything were to go wrong with the next harvest. This state of weather has enabled the farmers to thrash freely, and to cart their manure on to the land largely, to be ready for the first favourable opportunity of planting beans and peas; and after the snows have melted, and the ground has become tolerably dry, all hands will be engaged with spring tillage; and our millers may rely on it that then they will not have such good opportunities of getting into stock as they have had the past two months. Prices of English wheat are much lower than foreign, some choice Dantzic having commanded 90s. per qr., whilst the best Essex rough chaff cannot be quoted over 80s. per qr. Fine Rostock red is worth 88s. per qr., and the best English red cannot be quoted over 70s. per qr. at the present moment.

The frosty weather has been in every respect what the farmers wanted, to enable them to thrash out their cloverseed. And a finer crop they have not had for many years; and a good deal has already been brought forward, and sold at tolerably good prices, red varying from 50s. up to 68s. per cwt.—here and there an inferior parcel under the former, and now and then a choice lot or two of dark purple above the latter price. White is not so abundant as red, and commands high prices: good 72s. to 74s., fine 75s. to 76s., and choice up to 80s. per cwt., at least. There have been few importations of foreign, and, from the high prices in France, we are not likely to have much in. The loss of 200 tons by the Mercury, from Bordeaux, has not had any effect on our market, as would have been the case in some seasons, when English was not so plentiful. Trefoil is not abundant, the yield being indifferent; and prices range from 22s. to 30s. per cwt. Scarcely a sample of French has appeared; even "minette sauvage" does not come this season. Sainfoin is very dear, 60s. to 64s. per qr. for choice new. Of this article, we shall get some from France. The transactions in grasses have only been to a moderate extent yet, owing to the state of the weather; but now activity in every department may be looked for, and, the time being short, buyers must make up their minds pretty promptly, or they will lose many bargains.

There has been a good supply of tares on the market; but only a limited demand has yet been experienced, as buyers fancied they could get them equally cheap when the demand for sowing did come on; and all appeared disposed to wait.

Prices of the smaller descriptions are lower than they were last month; but large Brunswick are quite as dear as they were then, 64s. to 68s., and very large and handsome 72s. per qr. A few parcels of Scotch Falkirk have come forward, and these met a steady sale at about the rates of Brunswick. Small French have been imported in limited quantities, and these sell steadily; some of them have been taken for winter, and will have been tested whether they were genuine, and would stand one of our old-fashioned winters like this—we hope now past and gone.

Now, we trust, the markets will show more activity than they have done since the year commenced, and that every description of buyer will come forward to replenish his stocks, which he has allowed to go down so very low, unnecessarily we think. But there may have been more causes than have appeared on the surface. It is, however, a recorded fact that, after severe winters, a briskness has come over the trade; and we trust our agriculturists will succeed to their heart's desire this year, at least.

Some notice must here be taken of the agricultural statistics of Scotland, which have emanated from the Highland and Agricultural Society, and have been presented for the first time to the Board of Trade. In this effort to bring a mass of facts together, the society has been aided by about 1,100 tenant farmers, acting as enumerators of the various districts, and as members of committees of different parishes; and from the great interest evinced, the society has every reason to believe that the returns are remarkable for accuracy. The tables appended to the report are four in number. The first contains the acreage of the different crops, and the amount of stock in each county; the second table contains the gross produce of the principal grain and root crops in thirty-two counties; the third, the average acreable produce of such crops in each of these counties; and the fourth, the average acreable produce of all crops estimated by districts or subdivisions of counties.

Some deficiencies are observable in the first report. The average return does not, for several reasons, represent the superficial area of Scotland, as neither Highland crofters nor the occupiers of smaller holdings in the lowlands were invited to send returns. Crops which are cut growing for forage, as well as carrot, cabbage, or mangel-wurzel, are not returned; but the crops so excluded are grown but to a limited extent, and their omission has secured greater accuracy than it would have been otherwise possible to obtain.

Of the acres in tillage in Scotland there are shown to be devoted to the cultivation of wheat 168,216; barley, 207,507; oats, 932,994; rye, 3,809; bere or bigg, 18,118; beans, 37,702; peas, 6,169¼; vetches, 13,442½; turnips, 433,915¾; potatoes, 143,032¼; mangel wurzel, 1,946¾; carrots, 1,218; cabbage, 1,395½; flax, 6,670½; turnip seed, 1,429¼; bare fallow, 26,128¾. Of the acres in grass there were, in the rotation of the farm, 1,427,790¼; permanent pasture, 1,207,101¼; irrigated meadows, 69,256¼; sheep walks, 6,530,842¾; houses, roads, fences, &c., occupied 130,538¾; woods, 413,391; and waste, 830,703¼.

The amount of stock was as follows, viz.—horses, 156,535; milk cows, 262,365; other cattle, 438,334; calves, 205,172; ewes, gimmers, and ewe hogs, 3,360,289; tups, wethers, and wether hogs, 1,426,946; swine, 163,683.

Table No. 2 shows that the total yield of wheat was 4,848,499; barley, 7,639,601; oats, 33,854,319; bere or bigg, 537,250; beans, 1,080,921 bushels: turnips, 6,372,189; potatoes, 523,383 tons. The small growth of wheat will sufficiently account for Scotland receiving the greatest proportion of the late large imports of this article from the Baltic and north of Europe.

From these returns it would appear that all the controversies and conjectures of past years have proceeded upon enormous mistakes as to the amount of agricultural produce in Scotland, and it will most probably soon turn out in England too. It is a matter of universal admission that the produce of last year was considerably above an average, both as to acreage and yield; and yet what will our readers, and, not least, our agricultural readers, think of the fact that last year's produce was, on the whole, not much more than, and in wheat somewhat less than, a half of what has hitherto been reckoned the average annual agricultural produce of the kingdom?

The most authoritative estimate hitherto in use has been the one made by Mr. M'Culloch some twelve years ago, from a great variety of data, and which received the corrections of some eminent practical authorities. Since then the produce has undoubtedly made a large increase; and often during that interval have we seen the estimate largely added to by the most purely practical statists. In order to present a glimpse of the lamentable extent to which we have all along been arguing in the dark, we here place in juxta position the quantities, stated in quarters, of each cereal annually produced in Scotland, according to the estimate and according to the ascertained facts of the large harvest of 1854:—

	Estimated.		Ascertained.	
Wheat	1,225,000	qrs.	606,063	qrs.
Barley	1,800,000	„	954,950	„
Oats	6,500,000	„	4,231,789	„
Beans and peas	150,000	„	135,115	„
	9,675,000	„	5,927,917	„

It will not be inappropriate, whilst on the subject of statistics to touch upon those of the West Riding of Yorkshire, and under the summary of schedules for unions, and they are comprised in Mr. Mainwaring's district, and include Doncaster, 53 parishes; Goole, 15; Hemsworth, 24; Knaresborough, 21; Great Ouseburn, 32; Ripon, 28; Sedburgh, 3; Selby, 16; Thorne, 6; Worksop, 12; York, 37; Berwick-in-Elmet, 42; Great Preston, 42; and parishes not in union, 82: some highly interesting particulars are presented.

The total number of acres occupied amounts to 615,010: under wheat cultivation, 78,549; barley, 45,650; oats, 29,326; rye, 1,488; beans and peas, 12,895; vetches, 2,194; turnips, 40,492; mangel wurzel, 528; carrots, 127; potatoes, 14,233; flax, 1,105; other crops, 2,692; bare fallow, 24,041; total under tillage, 253,335. The number of acres under grass, viz., clover, &c., 48,046; permanent pasture, 148,665; irrigated meadows, 26,000; sheep walks and downs, 7,156; total under grass, 229,869. The number of acres in houses, roads, &c., 14,526; wastes, 14,611; woods and plantations, 26,442; acres in commons, 40,471; in holdings less than two acres, 5,140; not accounted for, 30,633; total in houses and waste, 131,805. With regard to stock, there are 21,229 horses; colts, 6,342; milch cows, 20,386; calves, 17,995; other cattle, including working oxen, 26,705; tups, 4,052; ewes, 93,388; lambs, 100,109; other sheep, 65,431; swine, 36,626. The number of schedules filled up by occupiers, 9,480; by enumerators, 1,512; the number of schedules not returned, 265; total number of schedules in each union, 11,256.

Although some difficulties had to be overcome in obtaining these valuable returns, the want of which, in forming a correct estimate of the acreable produce of the district, has long been a matter of loud complaint amongst influential parties, a mass of information, unknown at any former period, has thus been secured, which, if rightly appreciated and properly used, is calculated to be attended with beneficial results; and once the statistics of the entire United Kingdom could be accomplished, we think the benefits would be so great and the information so complete, that the prejudice on the part of some would be entirely banished, and that they would be thankful to have such an abundance of information laid before them, and many an apparently ungrounded panic would be removed, and perhaps prevented altogether. We trust by this time next year we shall be enabled to lay before our readers a much fuller account than at present; if for England and Ireland as perfect as has been accomplished for Scotland, all the better. We hope the subject will be persevered in throughout the length and breadth of the land, and that our agricultural friends will lend their aid willingly on all occasions, until a full and complete account has been published and circulated for the benefit of all parties, and that those farmers who occupy only a limited extent of land will feel an interest in the question, and support the system all they can, and derive benefit themselves from it.

CURRENCY PER IMPERIAL MEASURE.

Shillings per Quarter.

WHEAT, Essex and Kent, white	72 to	74	extra	75	78
Ditto, red............	65	68	„	69	70
Norfolk, Lincoln, and Yorksh., red	66	68	„	69	70
BARLEY, malting, new.. 31 32	Chevalier..			32	34
Distilling.... 30 31..........	Grinding..			29	30
MALT, Essex, Norfolk, and Suffolk, new	65	66	extra		70
Ditto ditto old	66	68	„		70
Kingston, Ware, and town made, new	70	71	..		72
Ditto ditto old	68	70	..		71
RYE	—	—		44	46
OATS, English feed.. 26 27	Potato..			29	30
Scotch feed, new 29 30, old 32 33 ..	Potato			33	34
Irish feed, white	26	27	fine		29
Ditto, black	25	26	fine		27
BEANS, Mazagan..................	37	38	„	4[illegible]	40
Ticks..........................	37	40	„	4[illegible]	42
Harrow.........................	38	40	„	41	42
Pigeon	40	46	„	40	46
PEAS, white boilers 38 44.. Maple 38	40	Grey		36	38
FLOUR, town made, per sack of 280 lbs.	—	—	„	65	70
Households, Town 60s. 61s. Country		—	„	50	54
Norfolk and Suffolk, ex-ship	—	—	„	48	50

FOREIGN GRAIN.

Shillings per Quarter

WHEAT, Dantzic, mixed.. 80 to 82 high mixed	—		84	extra	89
Konigsberg ....76 78 „	—		81	„	84
Rostock, new ......76 78 fine			82	„	86
American, white ....78 82 red				72	74
Pomera., Meckbg., and Uckermk., red	75	76	extra	77	78
Silesian........................ „	73	74	white	75	78
Danish and Holstein .... „	66	70	„	71	75
Rhine and Belgium........... „	—	—	old	—	—
Odessa, St. Petersburg and Riga..	66	68	fine	70	72
BARLEY, grinding 29 30			Distilling..	30	31
OATS, Dutch, brew, and Polands 28s., 29s. ..			Feed ..	26	27
Danish & Swedish feed 27s. to 28s.			Stralsund	28	29
Russian...... 27 29			French..	none	
BEANS, Friesland and Holstein..................				40	42
Konigsberg .. 38 42			Egyptian ..	37	38
PEAS, feeding	35	38	fine boilers	40	43
INDIAN CORN, white	44	45	yellow	44	45
FLOUR, French, per sack......	60	62	Spanish	63	65
American, sour, per barrel	38	40	sweet	41	44

IMPERIAL AVERAGES.

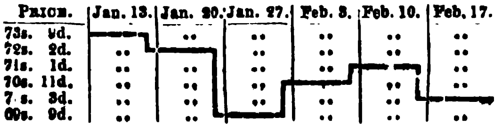
FOR THE LAST SIX WEEKS.

	Wheat.		Barley.		Oats.		Rye.		Beans		Peas.	
WEEK ENDING:	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.
Jan. 13, 1855..	73	9	34	2	27	4	45	6	46	5	43	5
Jan. 20, 1855..	72	2	33	7	26	11	45	8	45	7	42	9
Jan. 27, 1855..	69	9	32	2	26	8	43	2	44	6	41	8
Feb. 3, 1855..	70	11	32	2	26	7	42	9	44	2	43	0
Feb. 10, 1855..	71	1	32	6	26	2	42	1	43	9	40	5
Feb. 17, 1855..	70	8	31	9	25	7	45	3	43	1	41	0
Aggregate average of last six weeks	71	4	32	9	26	6	44	0	44	7	42	0
Comparative avge. same time last year	81	7	41	10	27	1	49	4	48	1	51	7
DUTIES........	1	0	1	0	1	0	1	0	1	0	1	0

COMPARATIVE PRICES AND QUANTITIES OF CORN.

Averages from last Friday's *Gazette.*	Qrs.	Av. s.	Av. d.	Averages from the corresponding *Gazette* in 1854.	Qrs.	Av. s.	Av. d.
Wheat....	85,872 ..	70	3	Wheat....	59,170 ..	80	1
Barley....	79,759 ..	31	9	Barley....	69,498 ..	39	11
Oats	19,328 ..	25	7	Oats	24,895 ..	27	5
Rye......	108 ..	45	3	Rye......	271 ..	49	6
Beans....	5,401 ..	43	1	Beans....	5,406 ..	46	10
Peas	1,739 ..	41	0	Peas	1,618 ..	51	7

DIAGRAM SHOWING THE FLUCTUATIONS IN THE AVERAGE PRICE OF WHEAT DURING THE SIX WEEKS ENDING FEB. 17, 1855.



PRICES OF SEEDS.

BRITISH SEEDS.

Cloverseed, red, (per cwt.)	50s. to 63s.
Ditto white..........................	68s. to 78s.
Cow Grass (per cwt.)	60s. to 68s.
Trifolium Incarnatum	00s. to 00s.
Rye Grass (per qr.)	22s. to 32s.
Furze (none offering)...................	00s. to 00s.
Tares, small 00s. to 00s., large 64s. to 72s.,	winter 00s.
Turnip, (per bush.) (none offering)	00s. to 00s.
Coriander (per cwt.)	20s. to 24s.
Carraway (per cwt.).... new 44s. to 46s., old	00s. to 00s.
Canary (per qr.)	48s. to 56s.
Hempseed	00s. to 00s.
Linseed (p. qr.) sowing 72s. to 74s., crushing	65s. to 67s.
Linseed Cakes (per ton)	£12 0s. to £12 10s.
Rapeseed (per qr.)	new 80s. to 82s.
Ditto Cake (per ton).............	£6 10s. to £6 15s.

HOP MARKET,

BOROUGH, MONDAY, Feb. 26.

In the absence of any active demand the market continues without any material alteration, and the business doing is limited to the immediate requirements of consumers, at about the currency of this day week.

POTATO MARKETS.

SOUTHWARK WATERSIDE.

MONDAY, Feb. 26.

During the past week the arrivals coastwise have been moderate: owing to the great quantity of ice in the river, the vessels cannot get past Woolwich, where there has been a considerable fleet lying for some days past.

The following are this day's quotations.

	s.	d.		s.	d.
Yorkshire Regents	110	0	to	130	0
East Lothian ditto	110	0	—	120	0
Perth, Fife, Forfarshire ditto..	95	0	—	115	0
Reds and Cups	75	0	—	100	0

BOROUGH AND SPITALFIELDS.

MONDAY, Feb. 26.

Our markets continue to be very moderately supplied with all kinds of potatoes. There is a slight improvement in the trade, as follows:—York regents, 105s. to 120s.; Kent and Essex do., 100s. to 110s.; Scotch do., 95s. to 105s.; do. reds, 80s. to 90s.; middlings, 65s. to 75s.; blues, 75s. to 85s.; Lincolns, 95s. to 110s. per ton.

POTATO TRADE.—There has been hardly any business doing in potatoes during the past week. The London and Glasgow markets continue heavy, and prices are looking down. Prices here for Cups are from 16s. 6d. to 17s. 6d., and Regents from 18s. to 19s. 6d. per boll.—*Perth Courier.*

PRICES OF BUTTER, CHEESE, HAMS, &c.

Butter, per cwt.	s.	s.	*Cheese, per cwt.*	s.	s.
Friesland......	118 to	120	*Cheshire*	66 to	80
Kiel............	108	116	*Cheddar*	66	80
Dorset, old	104	112	*Double Gloucester*	60	70
Carlow	100	106	*Single do.* ..	56	66
Waterford	94	100	*Hams, York* ....*new*	80	86
Cork, new	92	100	*Westmoreland.* ,,	78	82
Limerick	84	94	*Irish* ....,,	68	78
Sligo	96	102	*Bacon, Wilts., dried..*	65	68
Fresh, per doz. 14s. 0d.	16s. 0d.		,, *green....*	59	61

ENGLISH BUTTER MARKET.

MONDAY, Feb. 26.

The intensely cold weather having broken up, our market opens with less activity to-day, and a giving way in prices may be looked for. New Milk Dorset Butter is now reaching us, and for the first time we give a quotation as to price.

Dorset, fine new milk	112s. *to* 120s. *per cwt.*
Do., middling ....,	94s. *to* 104s. ,,
Fresh	12s. *to* 15s. *per doz.*

BELFAST, (Friday last.)—Butter: Shipping price, 96s. to 106s. per cwt.; firkins and crocks, 10½d. to 12½d. per lb. Bacon, 56s. to 60s.; Hams, prime 70s. to 74s., second quality, 64s. to 66s. per cwt.; prime mess Pork, 92s. 6d. to 95s. per brl.; beef, 105s. to 140s.; Irish Lard, in bladders, 66s. to 70s.; kegs or firkins, 62s. to 64s. per cwt.

Feb. 28.	*Butter. per cwt.* s.	d.	s.	d.	*Bacon. per cwt.* s.	d.	s.	d.	*Dried Hams, per cwt.* s.	d.	s.	d.	*Mess Pork. per brl.* s.	d.	s.	d.
1851..	56	0	90	0	43	0	44	0	60	0	63	0	60	0	66	0
1852..	77	0	82	0	38	0	44	0	54	0	60	0	60	0	63	0
1853..	86	0	98	0	56	0	60	0	70	0	74	0	87	6	93	0
1854..	95	0	102	0	54	0	60	0	70	0	76	0	87	6	90	0
1855..	96	0	106	0	56	0	60	0	70	0	74	0	92	6	95	0

CHICORY.

LONDON, SATURDAY, FEB. 24.

The supply of Chicory on offer is still somewhat extensive, and the demand for all kinds is heavy, at barely stationary prices. We have no imports of Foreign.

Per ton.

	£	s.	£	s.		£	s.	£	s.
Foreign Root (in bond) Harlingen	11	0	11	10	*Roasted & ground*				
English Root (free)					*English*	14	0	20	0
Guernsey	9	0	9	10	*Foreign*	30	0	36	0
York	9	6	9	10	*Guernsey*	26	0	28	0

WOOL MARKETS.

ENGLISH WOOL MARKET,

MONDAY, FEB. 26.

For home-use there is little or no inquiry for English wool; and, were it not for a moderate demand on continental account, prices would be considerably lower than at present. The supply on offer is large, with every prospect of a large addition to it.

	s.	d.		s.	d.
Down tegs	1	0	—	1	1
Half-breds	1	0	—	1	0½
Ewes, clothing	0	11	—	1	0
Kent Fleeces	1	0	—	1	1
Combing Skins	0	11	—	1	0½
Flannel Wool..........	1	0	—	1	1½
Blanket Wool..........	0	7	—	1	0
Leicester Fleeces	0	11	—	1	0½

LIVERPOOL WOOL MARKET, FEBRUARY 24.

SCOTCH WOOL.—In home wools the demand has been chiefly for skins; but fleeces continue rather neglected, and some kinds are rather easier to buy.

	s.	d.		s.	d.
Laid Highland Wool, per 24lbs. ..	9	8	to	1	0
White Highland do.	12	6		13	0
Laid Crossed do..unwashed	11	0		12	6
Do. do..washed	12	0		13	6
Laid Cheviot do..unwashed	12	0		14	0
Do. do..washed	15	0		17	0

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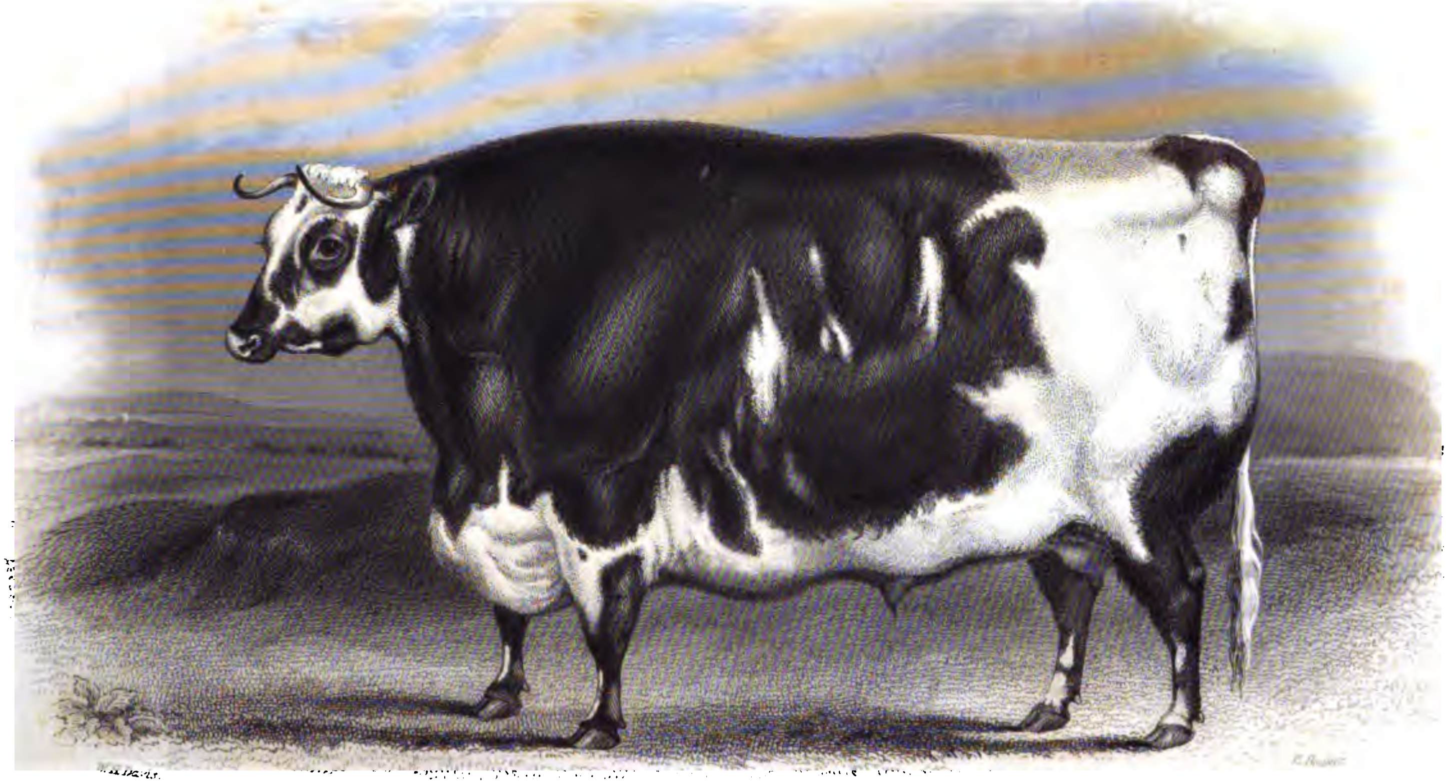

W. H. Davis. E. Hacker

A Short Horned Ox;

[illegible]

[illegible]

J. F. Herring Pinx

J. H. E[illegible]

[illegible]

A Thorough-bred Stallion, the Property of [illegible] Dennis Esq. of [illegible]

[illegible]

THE BRITISH FARMER'S MAGAZINE.

NEW SERIES.

VOL. XXVII. 1855. NO. LXXIV.

PLATE I.

A SHORT-HORNED STEER,

THE PROPERTY OF HIS GRACE THE DUKE OF RUTLAND.

The subject of our plate obtained the first prize of 25 sovs., and the silver medal, as the best animal in class 10, at the Smithfield Club Cattle Show, held in December last.

The special correspondent of the *Mark Lane Express*, in his review of the animals exhibited at this show, thus speaks of this famous beast:—" We scarcely remember seeing a better framed ox than this. If anything, he is not quite noble or grand enough in his general character. There is something, too, common about him, particularly in colour; but a deeper chest and length of rib is seldom seen. His girth is astonishing. His frame, though not truly cylindrical, is in reality of better form—a great carcase, on short legs of fine bone. His depth throughout is extraordinary. His ribs, though not sufficiently springing, are well set on chine and back, and nicely thrown out; their length very great. His meat of very good, if not indeed of first-rate, quality."

PLATE II.

LOUTHERBOURG; A THOROUGH BRED STALLION,

THE PROPERTY OF J. E. DENISON, ESQ., OF OSSINGTON, NEWARK,

To which the special prize of 40 sovs. for the best hunting stallion was awarded, at the meeting of the Royal Agricultural Society of England, at Lincoln, in 1854.

Loutherbourg, bred by Mr. Holbrook in 1834, is by Mameluke, dam by Smolensko, out of Miss Chance, by Trinidad—Gipsy, by Guildford.

Mameluke, bred by Lord Jersey in 1824, was by Partisan, out of Miss Sophia, by Stamford.

Loutherbourg's dam, bred in 1828, is also the dam of Hamlet, Black Stockings, Black Satin, Sir Peter Laurie, &c.

Loutherbourg is a dark-brown horse, standing fifteen hands three inches high. He has great bone and substance—is perfectly sound in all respects, wind and limb—his condition very good—and his action remarkably fine: a point in which his stock almost generally take after him.

Loutherbourg covered for some years in the neighbourhood of Vienna, but has travelled chiefly since his return to this country in Nottinghamshire and Lincolnshire. He is advertised this season in the neighbourhood of Horncastle. His stock are said to be very promising, powerful, and good-looking.

THE ACTION OF LIME AS A MANURE.

BY CUTHBERT W. JOHNSON, ESQ., F.R.S.

The action of lime as a manure has long, although I may add not very successfully, engaged the attention of the agriculturist and the chemist. They have both laboured to explain the action on different soils of this extensively employed fertilizer. They have remarked its beneficial operation when *first* used to certain lands—the generally inferior, and even prejudicial effect, of its *repeated* applications. It is not very long since Professor Johnston was employed in this important investigation, and still more recently Professor Way has in other paths been labouring for a similar object.

The ordinary explanation of the very limited good effects of repeated dressings of lime, which supposes that it it arises from the lime having thus gradually accumulated in the soil until more is no longer needed for the service of the farmer's crops, was shown some time since by Professor Johnston to be untenable. But as this conclusion is still so common, and stands at the very threshold as it were of our inquiries, it will be well to refresh our memories with the result of his experiments. When alluding to the common practice of adding a large proportion of carbonate of lime to the soil by ploughing the thin soils resting on the chalk into the substratum, the Professor remarks (*Quar. Jour. Agri.* 1848, p. 407):—"When from five to seven inches of pure chalk are brought up, and mixed with an upper soil of only six inches deep, it is obvious that the quantity of carbonate of lime in the mixed soil must be very great. And since these soils so deepened become, under skilful management, more productive than before, it is obvious therefore that the presence of a very large proportion of carbonate of lime will not alone prevent any soil from yielding good crops."

Through the kindness of Mr. Hewitt Davis, in sending me a portion of the surface soil of such a field near Croydon, I have found it to contain 41 per cent. of carbonate of lime, in the form of crumbled chalk. The natural soil of the plains of Athens in Greece, which produces *excellent crops of wheat*, but is liable when the dry season arrives to be covered over with a crust of saline matter which prevents its growing grass, was also analysed by Professor Johnston, and found to contain very nearly as much lime as the chalk soil cultivated by Mr. Davis. "We conclude, therefore," adds the Professor, "that as much as two-fifths of the whole soil may consist of carbonate of lime, without its being by this cause rendered unproductive. The soil from Athens contained, per cent.—

Organic matter	5·75
Salts soluble in water (common salt and sulphate of soda)	0·20
Gypsum	0·18
Oxides of iron	2·91
Alumina	2·35
Carbonate of lime (finely divided limestone)	38·08
Carbonate of magnesia	0·73
Phosphate of lime	0·03
Siliceous matter	50·33"

On the other hand, the proportion of carbonate of lime which some soils contain is remarkable for its smallness. Thus the rich marsh lands of Holstein and East Friesland were found by Sprengel to contain only the following amount per cent.—

The soil of the marsh lands of Holstein, only	0·2
The salt marshes of East Friesland ..	0·6

But, as Professor Johnston very correctly adds, "many causes may contribute to furnish such soils with a constant supply of carbonate of lime, sufficient for all the demands of the crops they produce. The floodings to which these lands are subject, or the supplies of water that are constantly brought into them from beneath, no doubt contribute in a considerable degree to the permanent richness of the soil they bear. When, therefore, the farmer attributes the evils of over-liming to the presence of any particular proportion of lime in the soil, he adopts a very natural, but a very erroneous, conclusion."

That this is not the real cause might be seen by a little calculation. If the farmer only subtracted from the amount of lime applied to a soil the proportion removed from it—first, by the crops; secondly, dissolved in the drainage waters; and lastly, the very considerable proportion abounding naturally in the most valuable cultivated soils—it would be seen that the amount of lime applied to a soil in a long course of years could hardly operate injuriously by causing an undue proportion in the soil of this ever essentially present earth. But the correctness of the conclusion does not rest upon mere calculation. Professor Johnston (*Quar. Jour. Agri.* 1848, p. 530) has shown by analysis that certain "over-limed" soils do not owe their decreased fertility to the largeness of their proportion of lime. He describes these supposed effects in some portions of Scotland, on thin, moorish soils, or on reclaimed peat, as apparent in rendering the land hollow to the tread, so much so that the foot sometimes sinks into it; the soil is open, light, and porous. Turnips and barley grow well upon it; oats and clover refuse to yield profitable returns. It is, in fact, too light and open for these last named crops, which require a certain degree of tenacity in the soil in which their roots are to fix themselves. "This condition of the soil," adds Professor Johnston, "is usually ascribed to too large additions of lime being made; and the expression *over-limed* applied to land in this state seems to imply that too large a proportion of lime is still actually contained in it. With the view of ascertaining how far this is really the case, I procured from Balliadalloch, in Banffshire, several specimens of soil in this light, porous, over-limed condition, in which they were incapable of growing oats and clover. The following were the results of the analysis of 100 parts of three of the specimens—

	No. 1.	No. 2.	No. 3.
Organic matter ..	10·29	9·54	5·65
Soluble salts ..	0·45	0·15	0·50
Oxides of iron ..	2·49	3·68	0·50
Alumina	1·71	2·54	1·11
Carbonate of lime.	1·40	0·69	1·10
Oxide of manganese	—	0·72	—
Insoluble matter, chiefly sand ..	81·77	82·79	91·20"

We see, then, that the largest proportion of carbonate of lime existing in these three specimens amounted to only 1·40 per cent., and in the lowest only 0.69. Now compare that with the analysis of good soils, like that of the plain of Athens, or those resting on our chalk formation, and note in what a much larger proportion the lime is often found in them.

The result of Professor Way's researches "On the Influence of Lime on the Absorptive Properties of Soils" is given in the last number of the *Journal of the Royal Agricultural Society of England* (vol. xv. p. 491). He evidently laboured under the impression, at the commencement of his experiments, that lime assisted in the absorption from the atmosphere of the ammonia contained in cultivated soils—a position which his repeated experiments do not seem to support. This he admits with his usual candour; but, as he truly enough remarks, when alluding to his not-yet-concluded series of valuable experiments, "certain inferences may, however, safely and with advantage be drawn from the results already obtained. The first of these is one which is not entirely new, namely, that soils and subsoils, long below the reach of ordinary farm operations, always contain a very sensible quantity of ammonia. In the following table of the results of some experiments, the lowest percentage which it exhibits would constitute a very considerable quantity of ammonia, when calculated on an acre of soil; whilst in the case of sample No. 15 the quantity of ammonia present is very many times more than would be added in a very heavy dressing of guano or other ammoniacal manure. In the following table, No. 15 was the top soil of London clay; No. 16, the same soil from 1½ to 2 feet from the surface; No. 17, the same soil from 3½ feet from the surface :—

	No. 15.	No. 16.	No. 17.
Ammonia in 1,000 grains — natural soil	0·293	0·1815	0·085
Ammonia in 1,000 grains—soil after liming	0·1692	0·1027	0·0404

"The second result" (adds the Professor) "which is exhibited by these experiments, is, that the action of lime in the presence of water is to set free from the soil as nearly as possible one-half of the ammonia. This result is so nearly the same in all the cases, that we are justified in believing it to be due to some special cause, and probably it arises from the existence of some compound silicates containing ammonia, of which lime, under the circumstances, can replace one-half—forming, for instance, a double silicate of alumina, with half lime and half ammonia. But a further suggestion is conveyed by the result of these experiments. Lime is capable of liberating one-half of the ammonia contained in a soil. Is it not possible that, for profitable agricultural use, the ammonia of the soil is too tightly locked up in it? Can we suppose that the very powers of the soil to unite with and preserve the elements of manure are, however excellent a provision of nature, yet in some degree opposed to the growth of the abnormal crops which it is the business of the farmer to cultivate? In the case of ammonia locked up in the soil, lime may be the remedy at the command of the farmer—his means of rendering immediately available stores of wealth which can otherwise only slowly be brought into use. In this view, lime would well deserve the somewhat vague name that has been given to it, namely, that of a 'stimulant;' for its application would in some sort be an application of ammonia; whilst its excessive application, by driving off ammonia, would lead to all the disastrous effects which are so justly attributed to it. I do not wish to push this assumption too far; but, if there be any truth in it, it points out the importance of employing lime in small quantities at short intervals, rather than in large doses once in many years."

To all such valuable researches as these, the inquiring farmer will heartily bid God's speed. The difficult struggle in which the cultivator is engaged in rendering the soil capable of producing crops such as Nature did not clothe it with, renders necessary many artificial appliances to make the soil equal to the task required of it. Of the many dressings of an earthy nature long successfully used in England, lime has long held a prominent place. It is more than probable that its use would still materially extend, if its action were better understood; for on many soils it produces the most powerful effects. But the uncertain way in which it operates, the injurious excess in which it has been frequently employed, has often induced its true value to be doubted, and even its use restricted in the farm leases of certain districts. It is by thus striving to clear away the difficulties which encircle all our efforts to aid Nature in her operations that we may hope to obtain such true and valuable knowledge as will protect the farmer not only from the injurious mistakes which he sometimes commits, from not understanding the chemical operation of the manures he employs, but from the ill effects of many a restraining covenant in his lease.

THE SOILS BEST ADAPTED FOR LEGUMINOUS CROPS.

At this late period of sowing leguminous crops, it may be too late to prolong advice upon the soils best adapted for them; the best sorts of beans and peas for different purposes, &c.; but while the management of these crops is an uppermost subject with the farmers of a large proportion of every county, we deem it advisable to examine into the various systems of culture of which they form a part. At the same time, we would remember that an agricultural journal has not alone to discuss novel propositions or confine its endeavours to the extension of new and successful methods, but must make ample allowance for that class of humble farmers who do not possess the means of carrying out many improved modes of management which they fully appreciate and approve. While we urge great alterations, therefore, upon the attention of men of capital and superior intelligence, it is equally our duty to recommend old-fashioned husbandmen to adopt improvements long ago understood and applied by leading agriculturists.

Now beans have always been one of the two or three corn crops in a bare fallow rotation on land too strong for producing roots; and when any one has suggested that some better use might be made of this crop than letting it merely help (like the white corn) to foul and exhaust the soil, he has too commonly found the majority of farmers to whom he appealed as proof as their sun-baked clay against any new impression. No class of men would be so unreasonable as to refuse an advantageous proposal without a substantial warrant for so doing; and, accordingly, the less enlightened order of farmers have contended that a *frequent* recurrence of bare fallow—to avoid which must be the object of a different employment of the bean crop—is indispensable to the cleaning of heavy clay land; and this being the case, it is cheaper to get all the corn they can in the common way, and then clean thoroughly in one season, than to expend capital and labour in a longer course of cropping, including green crops, which are neither as profitable as corn, nor half as cleansing as dead fallow. It is quite true that a better system of bean-growing is advocated as one means among others of shunning the costly process of dead-fallowing. The question, therefore, comes to this issue: are bare fallows really indispensable upon a well-drained and subsoil-broken clay, in spite of the most ameliorating course of crops and tillage that can be economically pursued? If any scientific agriculturist thinks not, he may obtain plenty of affirmative answers from intelligent occupiers upon the Oxford clay and blue lias. Nevertheless, we agitators and abettors of all agricultural progress continue to insist that what has been successfully and profitably accomplished for a long succession of years in one locality, can answer just as well in another, having an identical character of soil, climate, and other accessory conditions. Let us, then, state briefly some of the systems of cropping which have banished dead fallows and made good use of the bean crop, without referring to any complicated twin growth of beans and turnips, or other mixtures, requiring the cleanest and highest farming; or to the processes of burning clay, applying lime, or dressing with specific manures.

One system is based upon the principle of selecting such crops as have a tendency to render heavy land friable by the mechanical action of their roots, while at the same time ameliorating it in other ways—as vetches, winter beans, and clover. In 1842, Mr. Stace described, in a prize essay, the following rotation, which he followed in Sussex:—First year: Winter-tares, turnips, and rape. The tares are sown the previous year on a winter-bean stubble, which is ploughed, worked, and manured for the purpose, care being taken to use rough unfermented dung; as *the less this is decomposed the lighter and drier will be the land in spring*, after the tares are fed off. That the tares may come up in successional crops, they are sown at four different times, from the beginning of September to the end of October; a proportion of rye being mixed with the tares on one plot, and wheat with them on another, the later sowings being of tares alone. This is fed off with sheep in spring, the folds being shifted twice a day, and the forage cut and put in moveable cribs. As fast as the land is cleared of tares, weather permitting, it is prepared for turnips; and Mr. Stace has found that heavy land becomes earlier dry and friable after bearing a crop of tares than after a winter fallow. An early sort of turnips for feeding off with sheep is sown at the end of May: all the ground that can be prepared before the middle of June is sown with swedes, to be carried off the land; a later sort is sown by the end of June; and rape is then put in upon the remainder of the land. Second year: Wheat. Third year: Clover on one-half, sown on the wheat, and reserved for mowing. The other half of the land is sown with trefoil and rye-grass, which produces good food in the wheat stubble after harvest and early in the spring; it is then ploughed up, and when dry enough sown with spring tares in successive plots till the beginning of May. In feeding these tares off with sheep the land is manured for the following wheat crop; and the clover-ley may be manured by folding on it at night those sheep which are eating off the turnips and rape, as the land on which the latter grow has already been sufficiently enriched. Fourth year: Wheat. Fifth year: Winter beans. These are drilled in October on the ploughed wheat-stubble; and the rows are wide apart in order that the horse-hoe may keep the land as clean as possible.

In this rotation there is provision made for extirpating couch, early spring tillage for corn crops (such as oats and spring beans) is avoided, and abundance of green food is supplied for the manufacture of good manure.

But on really stiff clays, *where no root-crops can be grown at all*, how can we abolish the bare fallow by the help of beans? Mr. Vallentine, in his admirable practical prize essay "On the Cultivation of Beans and Peas," in the last number of the Royal Agricultural Society's *Journal*, demonstrates the utility of the following course: 1st, beans, dunged; 2nd, barley; 3rd, seeds; 4th, wheat. This may be extended into a fifth or sixth course by alternating oats for barley, and having two years' seeds. Winter beans are only to be sown when the land is clean, as the early autumn ploughing assists the spread of couch. To make beans a cleaning crop, plough early in winter, applying the manure, if possible, at the same time; for nothing is more certain, both in principle and experience, than that the fermenting dung physically improves the soil during this winter burial, so that scarcely any labour beside heavy harrowing, or it may be a scarifying, is needed to precede the drill in spring. The beans must be in wide rows, and repeatedly and deeply horse-hoed. A bare fallow may be the only available method for cleaning foul land; but this bean-management is well adapted to *keep it in a clean state*, when combined with autumn tillage in other parts of the course. The main points are, early winter ploughing, and spring and summer surface-tillage; and as an incidental advantage, Mr. Vallentine mentions his own observation that the beans are *less* liable to disease after winter than after spring-manuring.

To exemplify a system which seems a *compromise* between a naked fallow and a fallow green-crop, and is, perhaps, more likely to meet with favour on very strong clays, we add the following six-course rotation of a very skilful manager with whom we are acquainted:—1st: Fallow, which, after being well wrought and cleaned, is manured with twelve bushels of bones per acre, to insure a good crop of white mustard sown in July—a small portion being reserved for tares. In autumn the mustard is ploughed down, to enrich the clay for the main crop.—2nd. Wheat: The stubble being dunged in November, is ploughed for (3rd) Beans, which early in spring are drilled on the friable winter furrow. The beans are not horse-hoed, but thoroughly well hand-weeded. The bean-stubble is twice ploughed before winter, by which (being in a dry state) the growth of root-weeds is checked; and in spring the land is merely stirred with a large harrow in preparing for (4th) Barley, the pulverized condition of the upper soil being just suited both to the barley seed and the small seeds of (the 5th crop) Clover, sown at the same time. Well-rotted manure is laid on the young seeds after the barley crop has been removed, to encourage a heavy crop for feeding off with sheep, which receive also a supply of peas or beans daily. A small portion of the seeds is mown for hay. About the middle of September, the land thus enriched is ploughed; and, after lying exposed to the action of the weather for about a month, is harrowed and drilled with (6th) Wheat.

This rotation and management are well worth the study of our readers: and let them particularly note the avoidance of spring ploughing for both the spring corn crops; the winter exposure of the land *three times* during the course, and *two years together;* the winter burying of manure for spring beans; the early forcing of the seeds by an autumn dressing of dung; and the enriching of the fallow with wheat-food in the shape of green vegetable manure, forced by a heavy application of bones.

AGRICULTURAL POSSIBILITIES.

No. IV.

STEAM CULTURE: MANAGEMENT UNDER A NEW SYSTEM.

How are these appliances to be brought into general use? We need not repeat, except to save time in reference, that having obtained a cultivator such as I have suggested, to be worked by the steam-engine, our first act of business shall be in the spring, in sowing a field with barley, allowing ourselves a very limited number of cart-horses.

Putting in Corn Crops.—We take our engine and cultivator to the field, and place the engine in a convenient position, affix the two anchorages at each end of our work, and attach our cultivator to the wire-rope. The steam is up, and the work proceeds. We break up and pulverise the soil to the depth of five or six inches, and leave it in chequered sizes. The anchorages are of course moved at every end by an attendant in readiness, so as to take the next draft, and this by rule, so as not to vary the breadth, and to prevent intermission in the work. When a sufficient breadth of work or land is attained, we loose from the cultivator, and in lieu thereof attach our drill to the rope, and harrows to the axle of the drill, or other simple contrivance: the sowing and harrowing in the seed thus proceed together. The same course will suffice for all other crops requiring the like simple process, as those of oats, beans, and peas, as also wheat in the autumn, &c.

Fallowing.—In fallowing, the course to be pursued must vary according to circumstances, and the requirements of the different soils. To describe one course, which, for want of space, and to avoid being tedious, must suffice. The land, of course, must be subsoil-drained: there can be no good farming without it. In the autumn or winter, it should be broken up in the most open and in the roughest manner for which our machine is adapted; so that the pieces of soil are large and chequery, and laid well apart to give room for atmospheric influences or aëration, and to make it approach as near as possible to trench-work or digging. In the early spring, if the weather is dry and suitable, it should again be broken up, still leaving it rough and open. After this, it will be desirable to use some of our most approved scarifiers—Bentall's, Biddle's, Coleman's, &c.—or the ordinary drags, as in all cases the steady draught of such implements will leave the rubbish more evenly on the surface, for gathering off by manual labour. These implements, as also the common harrow and rubbish-rake, may readily be worked by the same apparatus. In this way fallowing may advantageously proceed with every prospect of benefit to the soil. When all is sufficiently worked, and a fine tilth obtained, and ridging for turnips is required, three or four moulding or double-tom ploughs may be attached to the engine-rope, as before named, and the work thus set out for manuring. This manuring had better be accomplished by horses and carts; although it is possible to do even this work by the engine and anchorages, if the manure is laid in convenient and suitable heaps where required, *i. e.*, on the headlands or otherwise. These things would soon become matters of arrangement —(however, if the new lights are to prevail, this manuring is all to be effected by hydrants in a liquid form). When a sufficient space is manured, the closing up the ridges may go on in succession, opening a few bouts, and then closing others as they are manured, to be followed by the drilling. On flat work it may be desirable to manure in the winter, or prior to the second operation with the cultivator. It will thus become well incorporated with the soil; and before the summer's sun has power to dry it, to its serious injury.

Harvesting.—It would be a matter of easy adjustment to attach and work one or more reaping machines with the engine, wire-rope, and anchorage, either to cut grass or corn; and, providing the stacks are made in the field, the crop may be readily carried by aid of the engine, &c. The rows of stooks may be laid on carriages with facility, the carriage being stopped at each stook by relaxing the clasp as in ploughing, and already described, or the loading may proceed as the carriages slowly pass along. Horses may be useful in drawing the carriage from the anchorage to the stack and back. But this latter operation, that of harvesting corn by aid of steam, seems superfluous, as the horses necessarily required for such purposes should suffice; I only wish to show that this, too, is an "agricultural possibility."

Drainage.—In works of drainage the steam engine may be very effectually employed. It will not be requisite for every farmer to keep a draining-plough like Mr. Fowler's, on his farm; but it will be very desirable to have such a one in every district, to be let out for general service. No manual labour can do work more efficiently than is done by this implement, nor more evenly, and in such exact lines, the pipes being made to correspond with the size of the bore or foot. They fit admirably, and are left firm and fast, as the plough proceeds.

Thus, what with the thrashing and other yard work, the cultivating and other field work, the steam-engine may be pretty nearly employed during the whole year.

Those farmers who have smaller occupations may find it to their advantage to join company in the ownership and use of one; or, as in the common thrashing machines, many may be kept for purposes of letting out to hire, which will bring this mode of culture within the means of every farmer in Great Britain.

No. V.

STEAM CULTURE.

The Management and Preparation of the Land for Steam Culture.—There cannot remain a doubt but that, with a new order of culture, a new course of management must be pursued. We are quite prepared to give up some of our long-cherished and highly-approved processes, both in executing and finishing off our work. We yield to none in our experience of the pleasure we derive in viewing fields neatly laid out, with furrows straight and regular, or ridges equal and even, or lands nicely rounded and smoothly manured; and we know that good must result from such attentive management; but we do not think this beautifully neat management is wholly indispensable to a successful crop. It may be the work of years before such regularity and uniformity in field work can be attained by the new appliances for steam culture, but we have no doubt that ultimately it will be attained, to the satisfaction of every intelligent and unprejudiced cultivator.

It is very probable that for the present our fields will have to be cultivated in sections, or in squares, or in oblong patches, according to our length of wire-rope, the form of the field, or from other minor causes. We say it is probable; but steam cultivation is not by any means to be discarded on that account: we only wish to guard our readers against rash or unreasonable opposition, because perfection is not at once to be arrived at. However, we think that in our last paper we clearly showed, that even such field work could be executed, and with mathematical accuracy and precision, and also with great facility.

We will now endeavour to shew that, in some respects, our course of management must be more adapted and conformed to this new mode of cultivation.

Root Weeds must be extirpated.—The great obstacle to a rotatory mode of culture, or in breaking up the soil, is the existence or prevalence of root weeds. The roots of twitch, and other knot-rooted weeds, when broken or cut, form additional *sets*, and thus multiply plants indefinitely, and most injuriously. We have very little experience in rotatory cultivation; but, from the few experiments we have seen, it is our impression that rotatory machines break up more *sets*, and intermingle them more with the soil moved, than is done in plough culture; we think, therefore, that far greater attention must be paid to the eradicating these pests than has hitherto been given to it: these root weeds must be looked upon as the great barrier to steam cultivation, and should be dealt with accordingly. Forking, hand picking, and other unwearied attention in detail, and the many ways of destroying these pests, which every farmer will best understand, foresee, and practise, may keep down the bane.

In urging this matter more particularly, we by no means detract from the power of steam appliances to eradicate twitch and root weeds; we believe it to be a more efficacious method than by horse power, under any circumstances; but we do not think its best and legitimate application is to be for such uses. We think that its greatest benefit will arise from effecting deep cultivation, by *tearing up*, breaking up the soil, at great and irregular depths, by causing more thorough pulverization, thus bringing more particles of soil into active use. By these means adding vastly to the power of production, and extending the growth of crops; widening the usual routine or rotation of cropping, by permitting the introduction and growth of new species of crops on various soils hitherto not grown upon them. It will also give a continuity to the productive power of the soil, independently of the fallowing processes, by giving greater facilities in variable weather for cultivation than could be obtained by the use of the horse; by the extent of work it could effect in a given time; and by its capability to perform that expeditiously at the precise time. These advantages, and many others, would be derived from steam culture. We might stay to point out how these benefits accrue; but, as our space is limited, we only lay before our readers such outlines as we deem but barely sufficient to cause and enable them to think out the subject for themselves.

Open Courses of Culture necessary.—We are satisfied in our conviction that the customary courses of culture, such as the "four-course shift," "the five-course shift," or any other "shift," must give way to the all-powerful operations of effective implements worked by steam power. We look for a vastly extended and unfettered order of agriculture; we anticipate a vast and complete series of garden-like culture carried out upon every variety of soil, aided, as it will be, by manuring of every available character, the preparations for which are evidently going on favourably; we look for a higher order of cultivators, for a class of men of such intelligence, character, and enterprise, that no landlord or agent would desire to circumscribe or control in their efforts. We know that good cultivation and abundance go hand in hand, and must go on to an indefinite extent. There is no bound or limit to good cultivation, but in restricted cropping. We strongly advocate the most liberal order of culture on the part of the tenant, and the abolition of all limitations as to cropping on the part of the landlord: the only restriction required is, that the cultivation and management shall be good, and everything done in a husbandlike manner. Good cultivation must enhance the value as well as the productive powers of the soil; we know of no bounds to either. There can be no exhaustion of the soil under good cultivation, be the crops what they may. Good cultivation combines deep and thorough pulverization, cleanliness in management, ample replenishment of the soil, and a due regard to alternations in cropping; this done, this accomplished, both landlord and tenant are alike content; but if the tenant fails to do his part, then nothing can be fairer than a landlord's restrictions.

THE SEWAGE OF LONDON.

The recent discussions at the Society of Arts on the Sewage of the Metropolis have turned out to be something very like this sewage itself. A peculiarly small amount of valuable matter may be discovered in an immense out-pouring of what is good for little or nothing. At least such can be the only fair analysis of the first of these two meetings. It is not too much to say that the result of this sitting did not tend to advance the question one iota. Like Lord Hoppergollop's stairs—

> "Three storeys high, long, dull, and old,
> As great Lords' stories often are,"

were the stories of the savans, commissioners, and others, who almost entirely occupied the evening. From Mr. Lawes, who commenced, to Mr. Ward, who concluded—both with terribly long stories to tell—the only really practical information we arrived at was that which everybody knew well enough already. Mr. Lawes read a most elaborate paper, duly provided with tables and statistics, to show us of what sewage consisted, and what fertilizing properties were to be derived from it. This was the grand point of his address, most laboriously carried out we are quite willing to allow, but coming to almost precisely the same conclusions Professor Way did some time since. Everybody, in fact, was ready with a justly merited compliment to Professor Way. He had told them what might be expected from town sewage. If any confirmation was required, Mr. Lawes certainly gave it, but beyond this we gathered little. The Professor, however, had gone further, and assured us that the only method in which sewage could be profitably applied to the purposes of agriculture must be in a liquid state. Again, Mr. Lawes said "ditto to Mr. Burke." These were the grand results of that meeting—"long, dull, and old"—on the first Wednesday in March. As for the rest of the speakers, we would not weary our readers by attempting to follow them. The chairman of the occasion, Colonel Challoner, paid them the *rather* questionable compliment of "their all agreeing to differ." Mr. Chadwick, to be sure, was almost called upon to repeat himself, in justice to what he had really before said on the subject, but he added little that was novel: while Mr. Ward—that most sanguine of commissioners—came armed with plans and projects, which, if we never heard of before, it is not very likely we shall ever hear of again.

Is this the way to discuss the question of town sewage at this time? After confessing that we are bored and sickened with old stories that we have heard over and over again, in every possible shape and form, have we nothing better to do than hear them still? After generally admitting that we have at least satisfactorily ascertained one or two important points to regulate our further proceedings, have we nothing better to do than to go over the ground and get up to them again? It would seem not; and yet everybody knows we have. Let us assume for the moment that as a sanitary question the matter has been considered. Let us say that its value as a manure has been arrived at, and so let us proceed at once to the still greater difficulty, its application. Let us learn to what extent it may be beneficially employed; and by what means and to what distance it can be conveyed with sufficient economy to warrant its use. Call it as we will, an agricultural or an engineering one, this is *the* question; and for this the first meeting of the Society of Arts did little or nothing.

What was advanced on this occasion savoured far more of extravagant enthusiasm than sound practical reasoning. Mr. Lawes, for instance, suggests that *ten thousand tons of sewage might be annually applied to a single acre of land.* Professor Way naturally characterises this as being much too high, while Mr. Bailey Denton and other speakers even more directly objected to so monstrous a proposition. At the very lowest computation at which it is *said*, but yet far from proved, that sewage could be conveyed, this would amount to something over a hundred pounds per acre! It was the adjourned meeting that brought all these things to the test, and that argued the question as it now should be considered. It was then the difficulties to the engineer and the agriculturist were honestly encountered, and it was then we found how great these difficulties really were. Never, perhaps, were the component parts of an assembly exhibited in two more different lights. It is the general characteristic of true merit to exhibit some little diffidence; and had it not been for this adjournment the most valuable portion of the discussion would have been entirely lost. Has not the society some good rule to curb the officious volunteering of people who can only talk—without authority, experience, or discretion to recommend what they talk about? Surely, in many cases, ten minutes law would be quite enough, and then somebody else should be "laid on."

Passing over, however, the researches of Mr. Lawes, the deductions of Mr. Chadwick, or the practice of Mr. Mechi, all we would wish it to be understood well qualified to take their share in such a discussion, we come on to Monday last. We must let some of the evidence here speak for itself, and would so recommend the speeches of Mr. Scott, Mr. Heywood, Mr. Paine and Mr. Bailey Denton to the earnest attention of our readers. We have found it impossible to give these entire; but we have still been able to avail ourselves of much valuable matter. As bearing upon the agricultural part of the subject, the address of Mr. Scott is remarkable for the amount of information, sound reasoning, and strong testimony he brings to his aid. Never were the difficulties we have been urged to hurry over so clearly set before us; and never, alas! did they appear less easy to surmount. The remarks of Mr. Heywood, taking the question from another point, are equally worthy of serious attention. We can spare room but for little of what he said. As an engineer, however, he followed out the subject in all its ramifications with much logical power, and evidently great personal experience. The tendency of what he said was only the more to ignore what had been advanced the week previous, and to leave the matter, so far as it may become an agricultural agent, still surrounded with impediments that look almost insurmountable. And yet how farmers have been abused, for these last few years, for letting the wealth of our towns run to waste, being blind to their own interests, and so on! But, as even Mr. Caird was kind enough to say, at this very meeting, we must "not blame the stolidity of the farmers, as had been done by a speaker in the previous night's discussion, for any part of the failure of this system hitherto. It was quite a mistake to suppose that as *individuals the farmers were averse to the introduction of improvements, or unable to comprehend their value, or to appreciate their own interests.*" Of course it is. Well said, Mr. Caird! What a deal of fog we are clearing away to be sure!

It could hardly be expected that a debate upon the use of liquid manure could pass at such a time as this without a word or two on Italian rye-grass. It duly came in for this word or so, and that, despite the resolution taken on credit at the Farmers' Club, rather a hard one. There seems to be a growing anxiety for what we asked for on the partial detail volunteered of the Ayrshire system—a balance-sheet, already a household word at the Society of Arts. There would seem to be decidedly two sides to the picture. Even Mr. Telfer's practice is not all profit; while many more than doubt if it is associated with any profits at all. In an extract we borrow from the last number of the *North British Agriculturist*, it will be seen that the best farmers in Scotland have, after a trial, given up the growth of Italian rye-grass, and though this journal—a home authority, be it remembered—does to some extent recommend its use, it decidedly objects to the resolution of the London Club, and to the holding up of these two or three Ayrshire amateurs as examples to the practical agriculturist.

How often have we been told to look to Scotland! Shall we be allowed to do so now, and learn what the best farmers in Scotland and the North British agriculturists are saying and thinking about these matters? Before taking anything more upon credit, it may be quite as well for us to do so.

At an adjourned meeting of the Society of Arts, this subject, introduced on a previous occasion by Mr. J. B. Lawes, came on for a further hearing. We give, from a most voluminous report, so much as can be really considered interesting or valuable to the agriculturist.

Mr. T. Scott said, a pretty general unanimity of opinion was becoming prevalent in favour of appropriating the *whole sewage of London* to irrigation. When we saw the enormous cost of engineering works and material for *precipitation*, and the inferior article principally produced, namely, 60 per cent of carbonate of lime, or chalk, this feeling was intelligibly accounted for. No one, however, had as yet ventured even to shadow forth a plan on which this theory was to be carried out in practice, and it, therefore, appeared premature to launch so much recrimination as had been done against those, the business of whose lives was *remunerative farming*, for not accepting that which had never yet been put within their reach. As a practical agriculturist, farming land mainly for profit, he differed with Mr. Lawes and with a similar sentiment contained in a letter he held in his hand from Mr. Telfer, of Ayr, as to the propriety of forcing crops up to a point at which they became injured; but he was quite willing to use manure up to the highest point at which it was profitable. He at the same time was ready to admit, and had good data for believing, that ten times the present expenditure of manure could be profitably employed, if it could be obtained in any shape at the standard price of pure super-phosphate of lime, or guano. As one who, along with Mr. Skirving, of Liverpool, used the first handful of guano brought to this country, and afterwards purchased it at £26 per ton, he thought he might venture to say this much from his own conviction of the value of genuine manure. Mr. Mechi said that sewage manure could be profitably applied to cereal crops; we had no precedent, however, for such a doubtful practice, except on a very limited area of light soils in this country, or in the rice swamps of Italy, India, and America; in fact, the great desideratum in connexion with cereal crops here was how to *stiffen* and support the straw, not how to turn it into a weak aquatic reed. Just ask any farmer—he would not even stipulate for "an intelligent farmer," but one possessed of only the ordinary instinct of his kind—if he would like to have the fall of rain over his wheat-fields throughout the year doubled or quadrupled, and you would have a sound solution of the problem as to applying liquid manure to wheat crops generally. Few of us would like to miss Mr. Mechi's presence from these meetings, and from Tiptree Farm at his annual gatherings; but if he persisted in the practice of applying liquid manure to grain crops, his legitimate field of operations was not Essex, with its 180 rainy days in the year, but Italy, with its 38 (See Captain Baird Smith, on Italian Irrigation), or even the arid sands of Sahara. In these countries it was a question of *irrigation and a crop*, or *no irrigation and no crop*. This, however, was seldom the case with us in this country, and it therefore appeared to him superfluous to adduce the case of Italy, and other countries, with their comparatively rainless climates and arid soils, and where no parallel circumstances existed. The nature and appropriation of the soil, too, was so entirely dissimilar, that he thought he should do best to confine his remarks to what existed, or was proposed to be carried out at home in connection with sewage irrigation. The lowest estimate of the quantity of land required for the London sewage was made by Mr. Lawes, and amounted to 20,000 acres. He, at the same time, confirmed the all-but-universal opinion that grass, either natural or artificial, was the only crop to which liquid manure could be profitably applied. Now, although London was surrounded by grass lands, he could not see that this 20,000 acres could practically be obtained out of a less area than 40,000 acres, or upwards of 60 square miles of land, being a larger area than that on which London stands (and here, within parenthesis, he would say that the Italian irrigation was nearly always applied to land under alternate husbandry). The first question that occurred was, how this immense tract of land for irrigation was to be obtained; were the owners and occupiers voluntarily to combine to take the sewage, or were they to be compelled under an act of parliament? He confessed this staggered him. Again, if the sewage at the rate of 10,000 tons per acre, as proposed by Mr. Lawes, was thus concentrated on a single district, would not the nuisance created be greater than that now existing in the Thames? Surely, if we were to pay for its removal, we were not to have an equivalent elsewhere. Why, residential property for miles around would be depreciated in let-able and fee-simple value, and its owners would indite the nuisance, as would all passers by, whether by road or rail—and who would answer for the consequences? Who would justify the scheme to the general public, who have no interest in getting cheap, bad milk near town, when they could by rail get better from a distance? It would be seen, by a letter he should presently read, that two eminent men, Dr. Sutherland and Professor Simpson, of Edinburgh, had reported against the fœtid irrigation of one of the newest water-meadows near that city, and that medical men had condemned the milk. If, on the contrary, it was attempted to apportion out the sewage of London in driblets over a wider expanse of country, Mr. Lawes had shown that it would not pay, and the chairman had confirmed his calculations. When Mr. Chadwick said that it could be delivered at a distance of 10 or 15 miles from London, and 150 feet above the level of the discharging sewers, at 2½d. per ton, he surely never meant that it was to be spread over the land—which was the principal item of cost—at that rate; if so, many individual occupiers of light land could apply the sewage with advantage, but not even then at the rate of 10,000 tons an acre, as suggested by Mr. Lawes, which, at 2½d. per ton, would cost £104 3s. 4d. an acre. It could be used more sparingly, however, and no doubt with a profit to many crops. He had been in the habit, for five or six years, of sowing upwards of 100 acres of turnips annually with Chandler's liquid manure drill, using about three tons of water, or 672 gallons per acre, with signal success; but he never could get it distributed at less than about 6s. per acre, nor did he expect to do so, though this was nearly ten times Mr. Chadwick's price. Mr. Lawes valued the ingredients in the sewage of London at £774,528, and Mr. F. O. Ward calculated the water with which they were carried off, at ninety millions of tons. Now, if all this sewage was to be applied annually to 20,000 acres of land, we should have 100 inches deep over 60 square miles. Imagine such a putrid sea within sight of the largest and most condensed mass of human beings in Europe, and then say if such a thing was likely to be tolerated. Edinburgh, with its 800 acres, was bad enough in sultry weather, as he had personally experienced; but what was it to this! Then take the case of Edinburgh as to the effect on the animals fed on sewage grass. Mr. Stevenson, the author of the admirable prize essay on the Farming of the Lothians, lately published in the *Journal of the Royal Agricultural Society*, wrote him:—"Since *pleuro-pneumonia* became so prevalent, the loss from this disease in the Edinburgh dairies exceeds all belief. During the first year or two, the veterinary surgeon was called in; but as cures were seldom effected, the butcher has taken his place. The loss has been so great that many cowkeepers have been ruined. *It is rather suspicious, and against the system of feeding with irrigated grass, that Mr. Telfer, at Cunning-park, has been losing an immense number of cows*, and the ventilation of his cow-houses cannot be surpassed, and cleanliness is most scrupulously observed. It is quite understood here," (Edinburgh), "that the experiment at Myre-mill has been anything but profitable; and Mr. Huxtable has, we believe, partly relinquished the practice (Authority: Lavergne, the French agriculturist)." Then as to the special case of Mr. Telfer, a gentleman wrote:—"So great a nuisance is Cunning-park, that we have felt the most offensive smells near 'Alloway Kirk,' distant a mile and-a-half. We advised Mrs. Begg, Burns' sister, to indite him for a nuisance. This she declined doing; but we believe that other parties have been threatening a process of this kind." Another correspondent in Edinburgh, on whom he could rely, said:—"The meadows being very near the town (Edinburgh), and being irrigated so frequently as to produce three or four crops of very rank grass in the course of the season, were considered a very great nuisance by the inhabitants in this neighbourhood; and it was considered a great benefit to the city, generally, when the improvements connected with the Queen's Drive, &c., led to the practice of so irrigating those nearest town being done away with. In hot weather, and in certain winds, the smell from these fields was intolerable; and the grass had the thick, rank appearance of the grass of a crowded church-yard. The smell, and their insalubrity, affected the rents of the houses exposed to their influence. As to the effects of grass produced by them on the milk or meat of cattle fed with it, I can only say that the general impression on the part of the public was very much against such milk and meat." Another competent witness, and one who had assiduously laboured for the best interests of agriculture, Mr. William Wallace Fyfe, stated, in a letter to him:—"The Edinburgh cow-feeders compete *for* this foul produce of the irrigated meadows; but any one who has seen the interior of an Edinburgh cow-feeder's establishment (and I visited most of them during the prevalence of pleuro-pneumonia some years back), would not be astonished at his adopting anything artificial in his economy, which is all eminently abnormal." "It so happens that the parts of the meadows best adapted for this kind of irrigation are those least liable to exception. Much of it has been reclaimed from the sea, and has *not a human being living on it, or near it.* A still larger expanse has, perhaps, as many as *two houses* within its pale, and *very few near it*—and this is the only sort of solitude where it seems tolerable to introduce the foul-water irrigation. The Government, I may add, for the protection of Holyrood Palace, once questioned this right of foul-water irrigation (unsuccessfully) as injurious to health. The owners answered in behalf of 8,300 cows in Edinburgh, and 600 in Leith, mainly dependent on the meadows for subsistence, that the irrigation was absolutely necessary for the supply of milk and butter to the city." "A poor woman near where I lived had sent round her *fourteenth subscription list*, before I left Edinburgh, for *the death of her fourteenth cow*, and her supporters preferred setting her up in a greengrocer's stall to sanctioning a *fifteenth* death. What her mortality was on a small, that of many of those artificial feeders enjoyed at that time on a large scale." One more witness, and he had done: this was the agent for Scotland for the Agriculturist Insurance Company, which lost so much by insuring Edinburgh cows in 1845 and 1846, that they declined to insure this stock for several years; and, being himself an auditor of that company, he (Mr. Scott) had examined the books, and found the loss, out of 568 cows then insured, greater than in any other locality. Mr. M'Min wrote:—"I am decidedly of opinion that the grass raised on watered meadows around Edinburgh is hurtful to the cows fed upon it. Their constitution is so weakened that they cannot resist the effects of disease when attacked, and the result is, that the proportion of loss in Edinburgh cannot be less than 20 per cent. This loss cannot arise from the confinement in the town byres alone, but also from the food on which they are fed. The grass does not give flesh, but large quantities of thin bluish milk. When disease seizes the animals during the season in which they feed on grass from these meadows, *a day's illness reduces them to all but a skeleton.* From this, I would say it has a tendency to destroy the constitution of the cattle, unless mixed with food of a more substantial kind. I am as satisfied also that the milk cannot have the same good effects on those who use it, as milk from a country dairy. Shortly after I came to Edinburgh in 1849, and after I had carefully examined the state of the cows here, their housing, and manner of feeding, I would not use the milk in my family, but got a dairy opened, and had the milk brought by rail from the country. That dairy has succeeded very well; and *I understand that a good many of the principal medical gentlemen in town now use the milk there in preference to the other dairies.* This fact strengthens my opinion that town milk is not so good for use as country milk, where cows are fed on the common farm produce. I am not, however, aware whether it generates disease in those who use it, but I cannot see how milk drawn from unhealthy and unsound animals can be beneficially and safely used. In the summer season and in sultry weather the atmosphere around the meadows is far from pure. At every cutting of the grass the canals with which the meadows are intersected are opened or shut, as occasion serves, upon the cut portions. The sediment manures the root; and the damp land, when the canals are shut, being acted upon by the sun and air, renders the place unhealthy. *The Town Council has frequently discussed the matter*, but nothing has been done to remedy the evil as yet, although no doubt there will. The effluvia arising from the meadows was the cause of discussion and ground of complaint. Had I had time, I would have called upon the late Lord Provost, who took a great interest in this matter, and I doubt not he would have enabled me to lay before you such information as would have been of use. In the Transactions of the Highland and Agricultural Society for last year, we found Mr. John Barlow, W.S. Edinburgh, stating, "Go into Edinburgh byres, and you immediately hear cattle cough, and the dairyman says, '*it is quite natural.*' When cattle first come in from the country they do not cough, but it comes on quite soon enough afterwards." These were the opinions of men in the east of Scotland. Now, he had one letter from a large rent-paying occupier in the Duke of Argyll's estate in the west, and with which he was familiar, having resided as his Grace's agent upon it, and he stated that irrigation and house-feeding were supposed to destroy the procreative powers of cattle, and added, "The irrigation works in Ayrshire *are looked upon by practical farmers and good judges with great suspicion*, i.e. Messrs. Kennedy's and Telfer's. Mr. Ralston's is upon the gravitation principle, and is most admired, *and considered the most profitable*. Indeed, the others are considered to be the reverse, even though Mr. Telfer sells his milk at 6d. per Scotch pint; but no one can say, without seeing the honest balance-sheet." In justice, however, to Mr. Telfer, whose extensive and exact knowledge of the sciences of chemistry and physiology, and love of their pursuit, had, he had little doubt, been the main instigations to him to undertake his wonderful operations to illustrate "agricultural possibilities" at Cunning Park, and with the purest motives to instruct and not mislead—in justice to him, he (Mr. Scott) should read part of a letter to himself, dated the 14th instant. That gentleman said—"I have hurriedly read Mr. Lawes' paper, delivered at the Society of Arts, and agree with him in what he says about the advantage of manuring up to the point at which the plant is injured in its growth. It is better to put a large *quantity* of manure on a small area, than a limited supply on a more extended surface, *or*, if you choose, better to waste manure than land. I have been acting on this view in the growth of Italian rye-grass, and with most satisfactory results. I believe I could put the whole liquid of my forty-eight cows on one acre of Italian rye-grass, not only without doing injury to the plant, but with a decidedly more profitable return than if applied to a larger area." It must not, however, from this be supposed that Mr. Telfer would be able to feed his forty-eight cows off the acre so manured, for he saw by a report of the Board of Health, that he had *always* been under the necessity of purchasing not only foreign cake, but home-grown corn and hay, to sustain his cattle under his present system. But even if this irrigating system were found to be desirable and remunerative, the cost of carrying it out, generally, would absorb more than all the surplus capital of the kingdom. Take the case of the Duke of Portland, and who could imitate it by sinking £39,000 on 300 acres? But this proof was entirely wanting up to the present time, and we had as yet no pecuniary inducement, and certainly no sanatory one, to adopt the system, and after banishing the ague by drainage, to bring it back by pestilential irrigation! How to render town sewage available to agriculture remained one of the most urgent, but he feared unsolved, economical problems of the day, and the offer of £1000 for its solution, by Mr. S. Brooks, of Manchester, remained unclaimed.

Mr. HAYWOOD (Engineer to the City Commissioners of Sewers) said it was the provision of the distributing apparatus, and the cost of distributing, which was the principal item of charge in irrigating land. In most of the pamphlets of the Board of Health, which were not remarkable for giving estimates at a very high figure, the cost of this distributing apparatus was from £1 10s. to £3 per acre, and the interest upon this had to be taken into account, and, above all, the current working expenses, if the pipeage would not distribute by itself, but require manual labour, and above all a large supply of hose. The cost of this hose would be found to be a large element in the cost of the distribution, and this fact appeared to him to have been kept much in the back-ground in the argument; the wear and tear of this hose was exceedingly great, and the charges for this indispensable article, in distribution, would go far to prevent the general application of the sewage water of the metropolis. In the Board of Health estimates canvas hose was generally taken, because the first cost was less than that of other hose; but that which was cheapest at first was not always the best. He had used, he believed, every species of hose that had yet been submitted to the public, and he had no hesitation in saying that canvas hose was the worst kind there was. He had found it wear out much more quickly than any other. This was his experience in the use of hose in paved streets, not in agricultural operations. It was attempted to be shown that the sewage water was not so good as it might and would be, by stating that the sewers of London held back the valuable matter until it soaked away, or was evaporated; the phrase was, the drains and sewers "formed one system of extended cesspools." This was a favourite phrase with some people—a former officer of a Commission of Sewers first used it, and it had been constantly repeated ever since, no pamphlet of the Board of Health ever appearing without reiterating it in some shape or another—and most of the evidence which had been given on sanitary subjects, he could not help saying, had been given by those who knew practically very little upon the subjects of which they spoke, and that statement of Mr. Chadwick's, as to the whole of the metropolitan sewers being a cesspool, was incorrect. He did not mean to deny that some sewers were bad enough to deserve that term, nor that some drains were not, or that there was not room for improvement in the sewerage; but it was incorrect as applied to the metropolitan sewers as a whole, and they were not in such a condition as to allow all the sewage either to be collected in them, or to ooze out through them, so as to leave what ran off of little value. This was proved by the fact that the quantity of water discharged from the sewers daily was about the same as the water daily consumed by the population. Instead of it being the tendency generally of water to escape to the surrounding earth, those who traversed sewers knew that the water from all sides found its way through into the sewers. Again, if there was deposit anywhere, it was of the more solid portions, and that was known to be of the least value, the best of the sewage being the supernatant water; so that the sewage water of the metropolis at present might perhaps be considered to be as rich as it was ever likely to be. The cost of application was the real question. It was a very different thing, as regarded cost, to apply the sewage of a small town, with the country fit for its reception almost within the town, and to apply the sewage of the metropolis, most of which was produced at points miles distant from any lands fitted for its application; and not only that, but at such a level as would enhance the cost of its delivery at the point of its usage considerably. He feared greatly he should never—certainly not for a great many years to come—see more than a very small quantity of the metropolitan sewage so applied, and that, if the river was to be freed from its pollution, we must look to some other and more immediate means than the application of the sewage to the purposes of agriculture.

Mr. PAINE, as an agriculturist, felt satisfied that even grass lands might be over-manured by too large doses of sewage, so as not to allow it time to form those chemical combinations with the soil which Professor Way had spoken of, and which he had good reason to believe always took place in the land before the manure could be healthily assimilated by the plant, the manure being as it were digested by the soil, and thus fitted for vegetable use; and if so, it was highly probable that excessive manuring would produce a growth of crude vegetation of a poisonous rather than a nutritive character. He fully believed that the metropolitan sewage might be beneficially used as a manure to *every crop*, provided due regard were paid to the time and mode of distribution, and provided always that the land were, either naturally or artificially, drained, so as to ensure a porous subsoil. Upon grass land, and on Italian rye-grass, there was no difference of opinion—you had only to put on plenty of it. Mr. Mechi, too, had shown in his practice how much good liquid manure had done to his root crops, though, it appeared, he had not yet reached the *acme* of perfection, since we had seen that Mr. Wilkins, on the poor sands of Wokingham, as much transcended Mr. Mechi as that gentleman had ordinary cultivators. He would say nothing of the profitableness of this underground scheme of irrigation, and merely mentioned it now, as what might become the germ of important consequences in the mode of applying liquid manure. For his own part he would fearlessly place the sewage upon the soil destined for root crops at any convenient time, *before* as well as after the plants came up. He would now detail a few facts which had recently occurred on his own farm, which would tend to prove the soundness of Mr. Way's opinions relative to the possibility of successfully using liquid manure for corn crops, if placed upon the land at the proper time. 1. A field on a gravelly soil, resting upon chalk, was manured in September, 1853, with about 8,000 gallons of liquid per acre, from the farm-yard tank. It was sown in the beginning of November, with Payne's "Defiance Wheat," the same sort that the Rev. S. Smith, of Lois Weedon, sowed in his experimental crop last year. It was a rather coarse variety. The rick, being the produce of this field, was thrashed out in the autumn, the crop was 64½ bushels per acre, and was sold for £18 per load of 40 bushels. The crop of straw was fully 3 tons per acre. 2. Part of another large field of a similar geological character had been in Italian rye grass for three years previous to the spring of 1853, and during this period it had occasionally been liberally dressed with strong tank manure. It was sown late in the spring of 1853 with wheat, and the whole field was much blighted. Last year, 1854, the field was sown with oats, and the part which had previously been manured with the liquid grew the strongest crop of oats he ever saw. The crop of the whole field was a good one; indeed, the average growth of oats on his farm was upwards of 13 quarters, but this portion of about three acres greatly surpassed any other. The straw stood fully six feet high. 3. Another instance was on hops, in a field adjoining another farm-yard, in which there were spots where the chalk subsoil was faulty near the surface, and which were naturally less fertile than the rest of the field. Upon these spots in the winter time, when of course there was no growth in the plant, the liquid from the manure tank was pumped. This happened during two successive winters, and the result was the bringing of these poorer spots of land to the average fertility of the whole garden. He, Mr. Paine, regarded these "facts from the fields" as highly confirmatory of his friend Professor Way's researches in the laboratory, and he could confidently recommend them to the attention of his brother farmers, and he hoped they might tend to lead others to make similar experiments, as it was manifest that the safe application of liquid manure to the cereal crops had a most important bearing on the sewage question.

Mr. Bailey Denton would allude particularly to the process of irrigation advocated by Mr. Telfer, Mr. Mechi, Mr. Kennedy, and others, and he must confess he was far from satisfied that that process could ever be a profitable one. In order to charge the cost of applying liquid manure on the inheritance of land benefited by it, it must be shown to be profitable, upon that doctrine which ought to govern the affairs of all men engaged in agriculture, viz., that they ought to have a larger annual profit than a bare interest upon the outlay. With this principle before him he had tried to prosecute that inquiry, and he had come to a most unsatisfactory conclusion upon it. Mr. Haywood had most properly said that when it was delivered at 2d. per ton up to a certain point, it did not mean that it was delivered upon the farm at that price; it did not mean that it was supplied to the hydrants upon the farm, including the cost of the iron pipes and hose, and the cost of other means of mechanical appliance. No such thing! As he understood it, it was the delivery to a point adjacent to the farm or estate, or to a certain highway or byeway, and the landowner must apply it from thence. What more might be done was a question yet to be solved. No one could for an instant doubt that sewage manure was valuable; but to be profitable it must be applied, and he had not yet seen nor had he yet heard of any means by which it could be profitably applied. Mr. Lawes, to whom they were very much indebted for his valuable paper, had said that it might be applied to 20,000 acres at the rate of 10,000 tons per acre. Did anyone know what that meant? Twenty-four inches fall per annum was the average rain-fall of the neighbourhood of London; but this meant, if he could read arignt, 100 inches per annum, or four times the rain-fall! Could anything be more futile? He had visited Mr. Telfer's farm, and that of Mr. Mechi, and he had witnessed the application of liquid manure on the "Marcite" system at Edinburgh, and by various processes; but it seemed to him, that in the consideration of the subject all soils and all subsoils were viewed alike! A more fallacious proposition never was made. If he went to Mr. Telfer's farm, he found the soil to be sandy, and that, owing to this circumstance, it took in, and rapidly infiltered or discharged the water that it took in, thereby leaving, he presumed, in its passage through the soil, the fertilising matter of that liquid for the benefit of vegetation. But what was the maximum amount that Mr. Telfer applied in a year?—and in this instance they had before them the case of the farmer who had succeeded best, and who had fed his forty cows to his forty acres, and who, in his desire to economise every ounce of straw and liquidise every ounce of manure, housed his cows on cocoa-nut matting—why, they knew very well they were dealing with five inches of liquid, and that they were not dealing with a hundred! At each application of liquid manure he applied one-inch surface flooding. Now, what meant 100 inches' application? What did it mean if applied to the London clay, in contradistinction to the sandy soils? If five inches was sufficient in the case of a soil where there was a quick discharge, how could they think of applying 100 inches per acre to a clay soil absorbent and retentive, and which of course must be, in a question of this sort, a most material element, for we must not forget that when the sewers were issuing their full quantities, in consequence of the rainfall being mixed, as proposed, with the sewage, the land itself was in a wet state, and least able to receive a liquid, particularly if it were of the character of the clay soil round London. He knew enough of farming to be able to say that upon clay lands, even well-drained clay soils, they must apply the liquid manure in a very concentrated form to make it valuable at all. In undrained clay lands liquid manure was altogether valueless. He had gone through a series of careful experiments, putting on liquid manure, and increasing the quantity of fertilising matter till he got to the maximum, and decreasing the water till he got to the minimum, and then he saw an effect; but when he compared these several applications to equal dressings of farm-yard manure applied to pasture land, he found that the straw of farm-yard manure gave encouragement to the growth of the grass, as arose in the operation called "Gurneyism." He found a greater growth under the influence of farm-yard manure than was the case with the application of liquid manure, unless of an obnoxious strength. He repeated, there was in the straw of farm-yard manure a warmth which encouraged the vegetation beneath it, whereas the occasional use of liquid manure chilled the land by the evaporation which followed. Passing, then, from grass land, he came to arable land. He was, himself, at present most undecided upon the question whether it was possible profitably to apply liquid manure to arable land. He did not mean to say it would not ultimately be proved to be profitable; he hoped it would be; but at present they were not in the position to apply it profitably. He confessed that his opinion on this subject had been somewhat shaken by the testimony of Mr. Paine—a most valuable testimony certainly with regard to cereal crops, and it had somewhat taken him by surprise. From all that he had learned upon the subject he had formed an opinion that it was not valuable for cereal crops, and with due deference to the statement of Mr. Paine, he still thought it would be found so in the long run. With regard to root crops, he had some evidence that it was not profitable even as applied to them. He went to Mr. Telfer's farm last year, in consequence of what was stated by Mr. Caird at Mr. Mechi's gathering, and Mr. Telfer showed him a field of root crop, part of which had been irrigated and part not. He asked Mr. Telfer to point out which was which, but he was unable himself to do so, and he had to call his bailiff in order to distinguish between the two methods of treatment. Those were facts which a man like himself, prosecuting the application of science to practice, must ascertain with precision.

ENGLISH FARMERS AND FRENCH CRITICS.

It is remarkable how apt we are to underrate exertions which come under our own immediate and continual observation. That no man is a prophet in his own country may be susceptible of a more general application than many of us might at first be inclined to admit. We grow necessarily accustomed to the efforts of industry and perseverance hourly developing themselves before us, and as we use ourselves to them, the less perhaps are we able to appreciate what they accomplish. Our admiration is reserved for the grand effects of some novelty or surprise, which a strange hand shall have perfected, or another country have produced. Fortunately, however, this argument has two sides to it. What custom may have brought us to think but little of, a less familiar eye will regard in a very different light. The indomitable spirit to which we have hardly given a word of encouragement finds a much more grateful acknowledgment at the hands of our visitor. The successful enterprise which we ourselves have been brought almost to question, can point now to a well-deserved compliment, though given in another tongue. That we have chiefly had to fear has been the attentions of what Sheridan calls "some d—d good-natured friend or another," who has been too happy to make us the target for his ridicule and abuse.

This, we need scarcely say, has been peculiarly the case with the agriculturist. It became high fashion to malign him. There was hardly anything, indeed, that could be considered too bad for him. Whenever a gentleman wished to be considered smart and severe, he had nothing to do but to rake together all the Billingsgate he could, and throw it broadcast over the agricultural interest. Let our readers only turn back for a moment, and recollect what has been written and spoken in this wise within even the last two or three years. People who do not take the trouble to think for themselves must have been panic-struck. If there was a disgrace to this country, it was agriculture. If there was a sloth who had not advanced a step for these hundred years, it was the farmer. If there was neglect anywhere visible, it was in the cultivation of the land of this kingdom. Complaints were met with insult, exertions repaid with libel, and every effort made to render the tiller of the soil the laughing-stock of his fellow-men.

We feel we are not saying too much here. We could turn to twenty such cases it has been our duty to answer and expose. And not a hard duty either; for injustice, ignorance, and prejudice were the chief weapons we had to contend with. In doing this we have had to show again and again, not how little, but how much, the English farmer has advanced, and how bravely he has fought his way through difficulties which none other of his countrymen had to encounter. He has done this, we must repeat, not only without sympathy, but in the face of an opposition as unjustly employed as it was strangely persisted in. There are very evident signs of this at length giving way. The most flippant of observers are at last beginning to allow some little credit to the intelligence and enterprise of the practical farmer. We miss, too, those dire onslaughts which it became habitual, like stormy weather at certain seasons, periodically to expect. There are not, however, any great thanks due here. The initiative must be taken from the stranger visitor who has so becomingly proclaimed, for the benefit of his own people, those improvements and that superiority we ourselves have been at so much pains to deny or to depreciate.

In our recommendation, some two months since, of M. Lavergne's work on our rural economy, we had to record, with much satisfaction, his conviction that English agriculture is now the first in the world, and that it is in the way of realizing still further progress. His testimony has brought up, again, that of another of his countrymen, while the two have been very happily united with some equally excellent matter from one of our own. In the new number of the Highland Society's Journal there is a short paper on "the social position of the British farmer," in which the experience of these two French gentlemen is specially cited. In introducing them, the Highland Journal speaks so warmly, so justly, and so much in accordance with our own feelings, that we must allow our readers to share with us the pleasure of a perusal:—

"It was very much the fashion with a certain party in this country, a short time ago, to hold up to ridicule the farmers, as examples of ignorance and prejudice. The most vulgar epithets, expressive of these two conditions of mind, were applied to men who, in point of fortune, and in freedom from these very two defects, were infinitely superior to their accusers. The rapid progress of commerce and manufactures—to which many towns and cities owe their existence—by being concentrated in particular places, has produced a much greater effect on the popular mind, than the slower, but no less important progress made by agriculture, diffused over the whole kingdom. That skill and energy is not to be sneered at which now produces food for considerably more than 20,000,000 of inhabitants, from the same extent of land which was found capable of yielding produce only for 10,000,000 a few years ago. It must be gratifying to the British farmer to know that, whatever he may be thought of by his own countrymen, all intelligent foreigners, on visiting this country, are more impressed with the magnitude, the skill, the diligence, and perseverance displayed in the agriculture of the kingdom, than in any of the other branches of industry."

How true this all is! and how really grateful the unprejudiced approval of those who might, if anything, be supposed to view our progress with some little envy and disappointment! We have already quoted from M. Lavergne on this point; let us turn now to his fellow-labourer, M. de la Trehonnais, the English correspondent of the *Journal d'Agriculture Pratique*. He finds a congenial text-word in Mr. Colville's less happy treatment of the theme at Ashby-de-la-Zouch:—

"Between the social positions of the British and French farmers," he says, "there is the difference of a piano. But it is not the piano alone; to put up the instrument, there must be a drawing-room, which in England supposes a carpet, mahogany furniture, blinds to the windows, mirrors, &c. Can any one conceive the large red hands of our rustic women touching the ivory stops of the piano? To do this supposes white hands and delicate fingers, the whiteness and softness of which are maintained by the wearing of kid gloves. Can any one conceive our countrywomen pressing, with their large wooden shoes covered with mud, the pedals of an Erard or a Pleyel? The possession of one of these supposes delicate feet in fine shoes, which are never soiled with mud—yea, more, a carriage and horses, garments of silk, Paisley shawls, bonnets adorned with flowers, a gold watch and chain—in short, neither more nor less than a duchess. Well, the wives of the English farmers have all that I have mentioned. How? by what means? you ask. Open the excellent work of M. Lavergne, and he will tell you better than I can. It is, in a few words, because their husbands have well-drained fields, byres filled with cattle, stables with horses, and hundreds of sheep grazing on their hills, and fields of turnips instead of bare fallows."

And then he goes on from his own experience:—

"I know of farmers who keep their equipages, hunters, &c., and that in a country, too, which fifty years ago was but a desert, an infected marsh, the abode of fevers and rheumatisms—where the plants, the earth, the water, the air, were all tainted, and where now we hear in the farm-houses, prettier far than the chateaus of our beautiful France, situated in the most fertile and salubrious country, the sonorous noise of the piano, touched by the white hands of the farmers' wives. I say noise; for music is rare in England, though pianos are abundant."

Many thanks, Monsieur Correspondent of the *Journal d'Agriculture Pratique*, despite that cruel little epilogue of "music being rare, though pianos are abundant." How like the critique of a Frenchman, and yet how thoroughly honest it shows him to be! Many thanks, we repeat, to him; for we doubt not such hearty generous approval as this will do something for many of our correspondents here at home. Teach them to see beauties even in an English homestead, to honour rather than traduce even the exertions of an English farmer, and to do justice to a class of their countrymen they have rarely been willing to do justice to as yet.

ON INCREASING THE PRODUCE OF OUR SOILS.

It would, we think, be a useful labour, if our readers would favour us with such well-authenticated reports of extraordinary crops as have come within their *own* knowledge. Such returns from practical farmers might, amongst other things in this age of agricultural progress, assure us of the *possibility* of still further increasing the produce of our soils; but, at the same time, to be complete for practical purposes, such reports should inform us if any unusual expense was incurred in the preparation of the soil—any peculiarity in the other circumstances in which the land was placed. This part of the inquiry is too often neglected. We are sometimes told of crops of wheat yielding far above even the large general produce of 1854; of turnips, swedes, and mangel, of more than double the ordinary produce; of cuttings of grass equal to 70 or 80 tons per acre! But then, we are not so often clearly informed of the amount of outlay bestowed upon their production. The reports of mere amateur farmers indeed far too often neglect these things, as if they were small facts beneath the notice of their authors. This omission is commonly the most hurtful to the tenant-farmer, since it frequently leads his landlord to entertain most erroneous views of the value of the land *capable* of producing such large crops. He is hence led very naturally to suspect either that his tenantry are with little trouble reaping golden harvests, or that they might do so, by the bestowal of more skill, or capital upon the soil. It is therefore not very surprising that the tenant-farmer, who is so often publicly informed of the great occasional doings of enthusiastic young cultivators, should receive such accounts with little patience and less consideration than perhaps their merits really deserve. Then, again, if we reflect upon the language so often bestowed upon the practical farmer when our amateur friends are recounting their brilliant exploits, we need hardly feel surprised that the intelligent agriculturist is sometimes annoyed at, and more often inclined to ridicule, the details and novel facts with which he is so frequently furnished. He is too often, in consequence, led to despise the whole series of such experiments, when he might perhaps have studied with advantage the *results* obtained, however useless in practice may have been the *means* employed. That is—(for let us not be misunderstood)—we contend, a very important advance in our knowledge, to be well assured of the *possibility* of growing such crops as those to which we refer; it is laying a foundation on which practical men can rest their conclusions, and towards which they can direct their more valueble inquiries—researches which have now for a long series of years tended to the increasing prosperity of agriculture. It was in such a spirit that in December, 1854, Professor Anderson delivered himself. In his lecture, after sketching some of the methods by which the future prosperity of agriculture is to be promoted, he contended that the agricultural statistics of last year, partial as they were, pointed out one grand fact; for they tell us of the possibility of greatly increasing the produce of the land by simply bringing it up to that obtained by the first farmers; and as the means of doing so are well known, there can be no difficulty in effecting a very material increase; and though it could not be done at once, the improvement of the land being a slow process, it might by steady perseverance be effected in the course of a few years.

AGRICULTURAL TEACHERS AND THEIR CONTRADICTIONS.

Sir,—Among my acquaintance there are some dozen gentlemen who have been at considerable expense, both of time and money, to make themselves thoroughly acquainted with agriculture, and to find the best system practised in the kingdom. Several are about to farm extensively, the others to take the management of considerable estates, belonging tothemselves or others, and are not a little puzzled as to what system they should go upon, when listening to the contradictory statements of our agricultural teachers, and it is not singular when we come to consider the said statements.

First, we have a band of agriculturists who tell us that if we wish to manufacture the most valuable kind of manure and effect a saving or gain of 20 per cent. upon our present system, we must build covered homesteads, so as to have the manure produced by the live stock completely protected from the deteriorating influences of the rain, &c. And common sense seems to support this teaching, and by it the necessity for tanks is almost or quite done away with. But here our other instructors at once join issue, the "manure tank" being their *sine qua non.* Here Mr. Mechi, the good-humoured, persevering, but somewhat will-o'-the-wisp guide in farming, and his friends, Mr. Wilkins and others, tell us we are all wrong; that solid manure is a mistake: instead of protecting the manure we ought to deluge it with water, and that liquid manure, with its tanks, pipes, and steam-engine, is to be the saving of British agriculture. And one gentleman tells us, as a proof, that if we wash a cask of stable manure until all smell and goodness are washed out of it, and use the water for manuring, we shall have much larger results than if we had used the manure in its original state upon the same piece of land. In dry seasons, or for crops that affect moisture, such would undoubtedly be the case. But Mr. Wilkins's system is the climax of the "liquid manure" school. At a single sweep, he rids us agriculturists of a hundred-and-one expenses in the shape of draining, ploughing, &c.; but substitutes, it is true, rather a heavy one for his manure basins. By his system, as the readers of the *Mark Lane Express* well know, the English farmer is to find a fair substitute for the gold diggings of Australia, in gigantic basins of rich stirabout, composed of soil and liquid manure, and in which the soil will be kept in a constantly open and efficient state for cropping by the action of the liquid, thereby saving the expense of working the land. This, by-the-bye, would put a stop to the suggestions of an able writer in your columns for a new and complete tilling-machine to be worked by steam, which suggestions have been read by many with interest. The Wilkins liquid system would also put an effectual stop to Mr. Fowler and his ingenious draining plough; but if a possibility, then we may convert our barren, valueless heaths and commons into rich and fertile plains with the wasted sewage of our towns. Such are the opposing schemes of our agricultural teachers. It is a pity that in these days of "commissions," we could not appoint one of these skilful and impartial men to report as to which of these teachers the agricultural interest is to follow. Hoping that in the meantime some energetic and unbiassed men may experiment and give us their results in fair, *undoctored balance-sheets,*

I beg to remain, Sir, yours respectfully,

Feb. 28*th*, 1855. G. B. B.

SEWAGE MANURE.

BY J. D.

On no subject that is now discussed in the agricultural world does there happen such a wide departure from the original strictness of the question, and so much irrelevancy of quotation and remark, as on the point of sewage manure. There are constantly forced on the attention of practice the constituent parts of the article of sewage, and the chemical value, the great results that have attended the application under favourable circumstances, which are never mentioned, but on which the whole question hinges. The value of the article is undoubted, and has never been questioned; no constant repetition is necessary on that point, nor any doubt of all irrigation being very beneficial under the necessary circumstances. There may not be any waste of words to prove a settled fact.

This point being established, the most important sequence presented is the probable and possible application under the widely different circumstances that are found to exist. To drain the metropolis of London is no very Herculean task; far greater deeds have been done, and will be performed; and also the conveyance and collection of the sewage at the eastern lower end of the position. The great difficulty then occurs of raising the liquid from the low position to higher situations, where it can be used for irrigation. A comparatively narrow slip of marsh meadows on the river side may be ridged and irrigated with the sewage, which will act well on clay lands, and on any lands, though most largely on warm soils and dry alluviums. The extension of this use over higher grounds is the question to be solved.

The Edinburgh meadows are constantly quoted as a case in point, the great value, and the example that is afforded. The truth is, that not the smallest comparison exists; and that the two cases of London and Edinburgh are as widely apart as are the antipodes of our globe. Edinburgh stands on high ground; the sewers discharge the contents on the upper edge of declivities, and there has to be done only the small performance of distributing by channels the fluid mass over the surface of the ground. Here is presented a most favourable opportunity of use—an article flowing to the point of benefit, and wanting only the direction of guidance. And the surface is so very favourable that the formation into ridges is not required, which is often the heavy expense of irrigation.

London is placed in a low situation, and the position of the sewage is on the lowest parts, as liquids naturally seek the lowest points of congregation. The sewage flows into the bed of the river, and is there lost. To get the use of it, as at Edinburgh, there must be found some lower grounds which to irrigate, and these being wanting, the project occurs of raising it for use on the high grounds that surround the valley of the metropolis. The sewage may be carried to the east of London, and irrigate some few low meadows in that locality; but beyond this partial application an opinion may be hazarded that the vast sewage manure of London may remain a lost article as it has been, owing to the vast difficulties that surround the application. I may be wrong, but such has ever been my honest conviction.

In all successful undertakings there must be in presence a combination of favourable circumstances, which being used with energy and discretion, ensure a beneficial result. If one, or probably more, of the favourable adjuncts be wanting, it may be supplied artificially, and will add to the cost; but if several adverse circumstances are seen to exist, as with the London sewage, the whole undertaking must be condemned. Irrigation of any kind understands an ample supply of water at all seasons coming from higher grounds; the raising of it from a low to a high position is never thought of beyond the stoppage of a main stream to the height of its banks, in order to change the direction of the current. The favourable circumstances are seen to exist before any attempt is made: if the majority is adverse, the consideration does not occur with any reasonable person.

Some few situations may present, as at Edinburgh, a favourable opportunity of using sewage manure, when the neglect must be held as very highly reprehensible; other situations will present a number of obstacles to prevent any application. It is very true that in such cases as the sewage of London it is not the cost or the difficulties of the undertaking that form the chief consideration, but the ultimate result, or the object of attainment—not the magnitude of the means that are required, but the compensation that can be safely calculated to accrue in a permanent utility. Six cuttings of grass in the year, and a value of £20 per acre, are the subjects that have been attained in the highest realizations; but even this high value may be too dearly bought, as every object has its legitimate price, beyond which it is not recommended.

It may be suggested to collect the sewage of

London in cess-pools of convenient places, where it can be put into close casks, sent by railway into the country to be used as manure for turnips by Chandler's liquid-manure drill. This use of sewage, and of all finely reduced excrementitious matters in the proper dilution, is already very successfully performed by Mr. J. Kemp, of Thurlby Grange, near Alford, Lincolnshire, who very carefully collects all the sewage of his farm for that purpose, along with the excrements of the necessary fineness to pass the buckets and tubes of the machine. Mr. Kemp acts as an agent for Chandler's liquid-manure drill, and being an extensive farmer, has the power of recommending its use much beyond a mere machinist. But here again occurs the vast difference between using the collected sewage of a farm, and the transported article from London and similar large towns; an expense may intervene that will over-balance any value of crops that may be raised by the manure. On this calculation the whole matter depends.

The grassy produce of irrigation is very flaccid and unconcentrated, from the profusion of moisture that is administered; the crops of grass from sewage are very coarse, as seen in the Edinburgh meadows, and fit only for the voracious maw of milch cows, which will receive and digest almost any green substance. It can be used only for soiling milch cows and young cattle in yards; but that use is very great in value.

Clodpoles and thick-pated farmers may be gross in conception, slow and deficient in energy, dull of intellect, and hard to be convinced, and all that science calls him; but it is very evident that his business must be treated with very different fare than the idealogies of fire-side calculators, whose tongue finds no obstacle in making a speech, and whose pen glides smoothly along the paper. In the present time theory expects far too much, and it will be answered that practice does far too little; the former is only in danger of erroneous reasoning, the latter being in daily contact with matter, encounters obstacles which he can neither foresee nor remove, and which perpetually encumber and retard his progress; he can only grope his way with caution. The theorist wings his flight in mid-air: the farmer must follow as circumstances allow, and according to his individual case. But let there be placed before him such an application of sewage as occurs at Edinburgh, and which is perpetually held out as an example, when the farmer will not be slow in adopting the use, and realising the value, as other practitioners in any profitable business. One theorist taunts the farmer with his ignorance of chemistry, which is his hobby; another twits him that he does not know the value of sewage; a third sneers at his not knowing the inestimable value of scientific discourses; while all of them, if placed as these farmers are, would proceed as they do, thinking coolly, and acting cautiously; guided by circumstances, and making adoptions by cautious resolves. Theory must lead, and practice follow; the van of an army must often halt till the main body brings its succour, and the rear is in sight.

CROYDON FARMERS' CLUB.

On Saturday evening, the 27th of January last, the monthly meeting of the above club was held, J. Cressingham, Esq., in the chair.

Mr. STREETER addressed the meeting as follows:—"Mr. President and gentlemen, our worthy secretary having intimated to me that it would be my turn to introduce a subject for this evening's discussion, I rather unadvisedly fixed upon one, which I find a most complex and difficult matter to deal with; for it is a knot which science has not yet untied, and all that we know for certain about it is simply the result of our observation as to the *effect;* therefore, should I advance nothing but what is already known to you, or dip a little into chemistry or physiology, I must claim your patience and indulgence, as well as your assistance in the discussion which may follow on the question, namely, *What is the cause that some pastures will readily fatten stock fit for the butcher, whilst others, with an abundance of grass, will only keep stock merely in a growing or thriving state?* That such is a fact all farmers are, and have been, aware of for ages past; but why in pastures or meadows where there might be an abundance of feed, and in which are growing numerous varieties of grasses, which are now known to contain ample quantities of the nitrogenous, carbonaceous, and phosphatic compounds sufficient for nutrition, the amount of which elements, in all plants and their seeds, chemistry teaches us the test by which we are to judge of their respective economical values to form fat and muscle in the living animal? Although this may be, and no doubt is, quite true in theory, and agreeably to which, the animal ought not only to do well, but should become fit for the butcher—that it does not do so is one of the objects of our inquiry now. I have never yet heard any satisfactory explanation of it, nor do I imagine that our discussion will throw much light upon it; still some good may arise, if it only sets us thinking about it, and perhaps some others better qualified, and with more leisure for investigation; for it is an important subject, and merits an investigation by scientific men, bearing as it does a relation to the most economical way by which stock may be reared or fattened (as the case may be) upon our green crops.

"I will now state what I consider may be a probable explanation why the one does fatten so readily, and why the other does not, and also give reasons and authorities for such opinions. First, the fattening qualities of what are termed rich grazing lands may probably be owing to *all* the several elements of nutrition being present in such quantities in relation to each other, and in states of combination, that are well adapted for being assimilated and deposited as fat and muscle, thereby requiring no unnecessary expenditure of the vital power or principle to produce such effect. Now, from the numerous varieties of grasses found growing in such rich grazing pastures, we may not unreasonably entertain a supposition of this kind, namely, that the mean amount of all the several different elements of nutrition contained in a given weight of herbage ate by the cattle when grazing, are not far from a proper proportion with each other, to the actual requirements of the animal, and consequently requiring a less expenditure of the vital power to convert into, and deposit them, in those numerous combinations and forms required by the different organs and parts of the body. Dr. R. D. Thomson, in his 'Experimental Researches on the Food of Animals,' says—'Besides the necessity for the presence of the same materials in the food which exist in the blood, it is requisite that *each* should bear a certain relation to the whole.' Now it is reasonable to think that it is so, and also that where one or more elements in the food are in *excess*, that there must be an expenditure of vital power to get rid of such excess. That mysterious power, whatever it may be, I believe most physiologists consider is derived from, that is, manifested by the disintegration or breaking up of certain minute portions of the already formed animal, and not from the food itself before it has become a part of the animal. Professor James W. F. Johnstone, in his 'Lectures on Agricultural Chemistry,' says that 'It has been ascertained by physiologists that all the parts of the body undergo a slow and sensible process of renewal. The hair and nails we can see to be constantly renewed: they grow or are thrust outwards; but the muscles, and even the bones, are by little and little renewed inwardly, and rejected in the excretions, the place of that which is removed being supplied by new portions of matter derived from the food, and that this renewal goes on so rapidly, that in the space of time, from three to five years, the whole body of the animal is renewed.' I may observe that we know by experience when a rich pasture is broken up it takes many years when again laid down to pasture before it at all approaches to its former fattening powers, and also before it again produces all those numerous grasses (if ever it does again) which grew upon it before it was broken up. There may be another cause which aids in the fattening qualities of such pastures, and that is the presence of some plant or plants containing one or more of those class of compounds, which have the property of changing one compound into another, thereby saving an expenditure of the vital power in digestion. As an example and illustration of my meaning, I will mention that compound which causes all the starch in malt to be converted into sugar in our mash-tubs while brewing; chemists have named it 'Diastase.' It is formed by nature as soon as ever a bud or seed begins to germinate, and not before; and also in such roots or tubers as couch or twitch grass, the potato and the hyacinth; it causes the starch with which it is in contact to dissolve in cold water, in which it previously was incapable of being dissolved. And further, it then changes the dissolved starch into sugar, in which state it is better adapted for the nourishment of the infant germ. So great is its influence and power, that Professor Johnstone says one part of 'Diastase' will change and convert at least 2000 parts of starch into sugar. Long before science had detected the agent by which this was effected, man had availed himself of it in brewing, and the distiller also uses a small portion of malt with the barley or other corn he may use, the 'diastase' of which converts the whole of the starch in the barley into sweet wort—that is, into sugar. On the continent potato-starch is converted into syrup or sugar by boiling it in water, to which a small quantity of sulphuric acid has been added. None of the acid, chemists tell us, is lost, or combines with the starch to form the sugar, it merely induces and hastens the change—the higher the temperature the quicker the change.

"I will now go on with the other part of my subject, namely, why is it that the majority, I may say, of meadows which produce an ample crop of herbage to satisfy the appetite of animals grazing thereon, will not fatten them fit for the butcher without the aid of some artificial food? Here, again, as in the former case, we can only conjecture. We are certain that all the elements requisite to form the animal are present in the herbage and hay grown thereon, from the fact that animals bred on, and fed upon, the produce of such pastures or meadows come to full maturity in health and strength; still it does not follow that the several quantities of these elements are in such a relation to each other, and in such combinations of forms, as not to require considerably more expenditure of the vital powers to convert them into the various compounds to be assimilated and appropriated by the different organs and parts of the body, than would be required in the former case upon the good grazing land; added to which, another and, I think, perhaps the *principal* disturbing cause may probably be owing to the presence of some plant or plants among the herbage which exercise an unfavourable action upon the fat-producing powers, and which, from the soil being peculiarly adapted for their flourishing growth, may be produced in *bulk*, as compared with the *aggregate* herbage grown, sufficient to bring about the marked difference noticed. We know that many plants contain some compound or principle (minute though it may be in quantity) which exercises a marked or specific action on some particular organ of the body, either stimulating or retarding its proper function or duty; and when in excess nature exerts herself to get rid of the cause, which occasions an expenditure of vital power, or the organ so influenced adapts itself to the increased or lesser duties imposed upon it by the specific influence of any such principle which may be constantly taken into the stomach. To make myself and meaning here more clearly comprehended, I will suppose a case:—We know that some plants excite the kidneys to increased action. Supposing, therefore, that in any pasture (however abundant it might be in quantity) there were growing some plant or plants, which exercise an exciting influence upon the kidneys, provided that influence was not energetic enough in the first instance to produce disease of those organs, the secretion from them would be much, as well as permanently, increased under the daily stimulant taken with food. Now, as that secretion is wholly derived from the blood, we can readily form an idea that there must be a much larger quantity of blood required to furnish the increased quantity of urine secreted with all its salts, and other organic compounds, whether immediately derived from the food, or from the disintegration and breaking up of the already formed parts of the body as before alluded to. Such being the case, it would be natural to conclude that the animal would not become what we call fat under the increased consumption of the blood in that direction. This may seem to be putting an extreme case; but we should reflect that there is no organ or part of the body—varying, of course, in the different species of animals—on which there is not some vegetable production that exercises a certain specific influence, more or less, according to the constitution, the breed, and susceptibility of the individual animal. The same effects are also true as regards the inorganic elements of nature, and it is upon those facts, the result of observation, that the art of medicine is founded. I say again, if we consider this, there may be some reason for supposing that the accumulation of any superfluous quantity of fat and muscle, to the extent that we consider an animal to be fatted, must be *retarded* by the presence of any such plant or plants, in an *undue proportion* to the requirements of nutrition, whichever of the organs might be influenced in their action or proper functions.

"The next consideration is, what can be done to improve those pastures? All agree that where drainage is required it benefits their feeding qualities in most instances; draining is more often required in pasture land and meadows than is generally supposed. It increases the number of the finer sort of grasses, as well as increases the bulk of those already growing; it also gets rid of, or greatly weakens, those plants which delight and flourish in most soils, which, though they may not be called *wet ones*, still generally retain water to a considerable extent in the subsoil, and amongst those plants which flourish in moist soils, are many not favourable to animals. These pastures will also be greatly improved by *high manuring*, more especially where draining was required and has been done; for supposing *all* the injurious plants to remain which are natural to the soil, their bulk and produce, as compared with the more nutritious grasses, will be greatly lessened by the soil being made more rich and congenial for the growth of the finer sorts, which will by their greater numbers and more vigorous growth check and weaken the others; consequently there would be in a given weight of herbage a much larger proportion of the really nutritious grasses to the injurious ones than when the pasture was in its natural state, therefore with a less disturbance of the natural functions of the organs of the animals grazing upon it. Much benefit, I think, would arise if botanists, and those who make plants their study, were to direct their attention specially to the *qualities* and *properties* of those plants and grasses which grow in our meadows and pastures. Farmers have not time for such details; nor, indeed, is it necessary that we should enter into them. All we can do (I mean practical tenant farmers) is to observe for ourselves, and bring our reasoning faculties to bear upon the experiments and facts which are and may have been brought to light by the chemist, the botanist, the physiologist, the entomologist—in short, there is no science which does not, in one way or another, bear some relation to agriculture; and after we have seen the wonderful and mighty results, as shown in the electric telegraph, magnetism, &c., by the investigation of the cause of the seemingly trifling circumstance of the movement of the hind-leg of a dead frog when accidentally touched with a piece of metal near to an electrifying machine, we must not be too hasty in setting down any fact which scientific men have discovered, or anything that falls under our own observation, as too trivial to be turned to any good account. Our endeavour should be to think and reflect whether any, or what relation a new discovery, or fact already known, bears upon any department of farming. The improvement which has taken place in our breeds of cattle, sheep, and pigs, and which, I have no doubt, has quite doubled our supplies of animal food in 50 years, has not been brought about by scientific men, but by men of close observation and deep reflection, which qualities are generally the parents of sound judgment. It has been accomplished by practical farmers in every sense of the word, who by observation of a few of the laws of organic life, as manifested in animals living under different conditions as to food and climate, and availing themselves of those laws, have gradually brought about this vast improvement in our breeds of stock; but we have yet much to learn in fattening stock in the most economical way—in the proper proportions of the different kinds of food we give them, taken in connection with the varying conditions of the animal and its organs, which in time become adapted to the nature and qualities of the food it had previously been accustomed to, and there are many other matters respecting the food of which I am not competent to speak about. But I suppose your patience must be exhausted, and I will now conclude with thanks for attention." Mr. Streeter was loudly cheered on resuming his seat.

Mr. **Fuller** said the fact was obvious that some land would produce grass that would rapidly fatten stock, while other lands would not; but the cause was not so obvious.

Mr. **Churcher** said the main cause of the difference was, he thought, in the staple of the land which caused some land to grow coarse grass, and other land grass of a finer and more nutritious nature, and perhaps in the bad staple land they could never obtain grass of so highly nutritive a character as on another; but he thought draining pasture land was very beneficial in producing better grass for fattening stock.

Mr. M. **Walker** thought the difference arose entirely from the soil. In the neighbourhood where he had been brought up, where there was a rich alluvial soil, a friend of his had told him that he could fatten a bullock to an acre, and the land was rented at £3 5s. per acre; and he knew of other land that was not worth so much by 50s. per acre, going for nearly the same price. He had seen land let at 10s. per acre that would grow as much wheat as the rich land he had mentioned; but the latter at 10s. would do nothing in growing grass to fatten stock; so there must be something in the soil to make this great difference, and he thought it was a subject well deserving the attention of chemists to investigate it, so as to ascertain what the reason was. He had found alluvial soils the best generally for pastures for stock. They found that on the hills they could not make good pastures for fatting bullocks (Hear); but perhaps by the progress of science and inquiry they might arrive at the reason. It was of no use to grow a coarse kind of grass for stock. He thought it a subject that required a great deal of attention. When in Yorkshire, he had found that directly they got on the hills they could not get good grass, although they could grow good corn.

Mr. **Wilson** said, he thought it the most important subject that had been brought before the club since he had been a member. He had been in communication with some gentlemen in the Isle of Sheppy upon the subject, and had reflected upon the matter, but could arrive at no satisfactory conclusion; and on the farm which he occupied, he must say, the only thing in which he was beaten was the pasture land. His own observations were confirmatory of what Mr. Walker had said.

Mr. **Farley** said they were very greatly indebted to Mr. Streeter for the very able and, he might say, learned way in which he had treated the subject (Hear); for it was evident he had paid very great attention. There was one part Mr. Streeter had alluded to, viz., as to the draining. His farm was a gravelly soil, and where there was gravel there were generally springs, and it was more particularly necessary to drain where there were springs for pasture than any other land, for the cattle could scarcely eat the grass where springs were, or, at least, they would not fatten upon it. He could show them pasture where there were springs, and where a long sedgy coarse grass grew; but when drained, that kind of grass disappeared, and a better herbage grew, upon which stock would fatten; and he had some land that, although there was an abundance of grass grown, the cattle would scarcely touch it—it was long tory grass. He had found that the deep draining, unless they had the proper fall, was not desirable (Hear)—two or two-and-a-half feet was better than draining deeper (Hear.)

Mr. **Stenning** said he quite agreed with the importance of the subject, and thought it was owing to the peculiar properties of some grass as affected by the soil on which it grew that caused the fattening properties to stock. He had a large quantity of grass land, and he obtained a fine pasture, upon which he could keep a large quantity of stock, but he could not obtain that fatting quality he desired. If, however, he sent them afterwards to Edenbridge, they would get fat upon the pastures in that neighbourhood: there must, he thought, be something in the soil. With regard to the benefits of draining, he did not quite agree that it caused so much benefit by imparting additional fattening qualities to the grass; but the chief benefit was that they could turn their stock out longer on the land.

THE STATE OF ABERDEENSHIRE THIRTY YEARS AGO, AND AT THE PRESENT TIME.

Thirty years ago, there were no cattle fed in Aberdeenshire, with the exception of a few to meet the local demand, which was very limited. There were few of our farms enclosed; the corn was thrashed with the flail; few turnips were reared; the value of bones was scarcely known as a manure; the cattle were sold when four, five, and six years old; in winter, the young stock were put to the hill or the pastures during the day, and had a very small allowance of straw, with few or no turnips morning and evening, and no litter. They increased in years, but not in weight. The general object of the farmer, at that time, was to keep great numbers upon little food: it was a stigma to have an empty stall. In summer, the grass was overstocked; the cattle were herded, and folded at night. Messrs. Williamson and Reid, butchers, Aberdeen, were almost the only customers for fat cattle. The former of these gentlemen made a handsome fortune. It is but justice to state that there were a few intelligent agriculturists who deviated from the general mode of keeping stock. The Williamsons, the Leslies, the Harveys, Allardyce of Crobardy, Walker of Wester Fintray, &c., occupied large farms, and kept their cattle well during the winter. Part of them they fed for Messrs. Williamson and Reid; the others they made fit for the great Barnet Fair in spring, as Messrs. Williamson and Reid had the fat trade almost exclusively in their hands. The Williamsons, including George, St. John's Wells; James, Bethelnie; Robert, Armendo; and William, George's son, Easter Creekie, had the command of the spring trade. These gentlemen sent large droves to Barnet Fair; they sent them on foot 500 miles. The journey was accomplished in five weeks. We had no steam to carry them in those days. The Williamsons were the great men for the spring trade. The larger part of the cattle, however, were sold in the months of July, August, September, October, and November, to our local dealers, of whom we have a numerous supply, who drove them to the great Falkirk markets, and to England, to be fattened by the East Lothian farmers and the English graziers. Our farmers had a choice of customers to buy their stock at this season. The Williamsons had plenty of opposition; but their greatest opponent was Charles M'Combie, of Tillyfour. He opposed the whole firm single-handed, and often bought and sold more cattle than they did. He sold, at one October Falkirk market, fifteen hundred cattle, more than a thousand of which were grased by himself. It required a large capital to carry on such a business, and the parties occupied a very high position in the country; but such men as the Williamsons and M'Combie have nearly all passed away. The Messrs. Fawns are the only exception; they still carry on a very extensive trade in drove cattle. They will still have five or six hundred to one market. They deserve well of their country, and have proved themselves able and highly honourable men. It could not be supposed that cattle could pay much, when their treatment and the length of time they were kept are considered; but rents were low, the expenses small, and the mode of living was economical. The prices of corn and cattle got very high during the French war. Money was made by the farmer: we got more extravagant in our habits; the rent of farms rose, and the expenses of keeping them were increased. A dreadful reaction took place after the peace: the half of our corn-growing farmers were ruined. It might be well for the farmers at present to consider if it be not possible that there may be again a reaction, and to pause before they promise the rents some are doing at present. However agreeable it may be to the landlords to have high rents promised them, they will find that in many cases they will not be paid. Let us now turn to the present state of this county. By the introduction of steam, a market has been opened up for the sale of fat cattle. Bones and guano are extensively used in raising turnips, the breadth of which has been increased tenfold. The Swedish turnip has been introduced; our county is nearly all enclosed; our land is drained; our moors are cultivated; our farm-steadings are improved; our roads are good; railways intersect the county; London is brought within two days' sail or rail of Aberdeen; the six-shift has been introduced; our land is clean; machinery thrashes our corn; our climate is improved; our people are happy. Our breeds of cattle have been improved; shorthorns have been introduced. It might bring the writer into trouble to say that our breeds have been improved by their introduction. If he did so, the rearers of polled cattle would attack him. If he should favour the polled breeds, the breeders of shorthorns would be up in arms against him. The breeders of both are very jealous of their honours, and very combative. Our breeds have been improved. A completely new era has been introduced into our systems. Our most intelligent farmers saw at once the advantage they had gained, and immediately altered their tactics. Some were tardy in following: almost all have now conformed themselves to the new state of matters. The starving system has disappeared. The question now is, How many cattle can be properly kept? (not, How many can be brought through alive?) and what is the earliest period at which they can be sold? The cattle here are now all sold fat, when rising three years old, and part when rising two. The calves get plenty of milk, and are carefully treated when weaned: in winter, they receive as many turnips and as much straw as they can eat. Some give an allowance of oilcake. Our cattle are all early housed; those intended to be made fat are all tied up by the 1st of October; in many cases, the best lots by the middle or end of August. They are fed either upon early turnips or tares during the two finishing months, many lots receiving 4lb. of oilcake, or 2lb. of cake and 2lb. of corn a day, which pays the feeder well. Our friend Mr. Mechi is in error, when he says that cake will not pay. He is not deeply versed in the feeding of cattle. If Mr. Mechi would consult the Aberdeen feeder, he would convince him that oilcake, if used judiciously for two months, will return a very handsome profit. He will tell him that he does not let his cattle lie upon hard, wet boards, but gives them a bed as soft as his horses'; that their times of feeding are kept by the family clock; that they get their hours of rest; that his (Mr. Mechi's) cattle can have no inducement to go to rest; that they will only lie down when they can stand no longer; that under such treatment an Aberdeen feeder would expect no improvement upon his cattle whatsoever. He would tell him that stock does pay, and often pays well; that the farmers who have made money here have made it by stock, and not by corn.

There is a great difference between the value of a beast fat, and a beast prime fat. The majority of cattle cannot be made prime fat without an allowance, to finish them, of cake or corn: some of the finest quality may, by long keeping; but they are the exceptions. By bad management, all keeping may be lost; but where feeding is properly understood, there will be no waste. To the honour of that veteran and highly respectable agriculturist, James Anderson, Pitcarry, Kincardineshire, I may state that he was the first who shipped cattle by steam from Aberdeen to London; and the late lamented Mr. Hay, Shethin, was the first who sent cattle by rail direct to London. Instead of our farmers selling their cattle to be fattened by the Rennies, the Brodies, the Walkers, the Bogues, &c., the great East Lothian feeders and the English graziers, we now feed them for ourselves, and can make them prime fat.

In our most remote glens, one small farmer of forty acres sells his cattle fat, buys his guano, and raises the best of turnips. We have overdone the thing. Our difficulty now is to procure the cattle. We must winter more, and feed fewer. We must keep our stocks more mixed. The feeder cannot get the stock to buy he would like; he must buy the best he can obtain; and as rail advances further north, it will be worse with him yearly.

Aberdeen, 1st Feb., 1856.

—North British Agriculturist.

PLANTING.

"Plantations," says Lord Bacon, "are amongst ancient, primitive, and heroical works. When the world was young, it begat more children; but now it is old, it begets fewer; for I may justly account new plantations to be the children of former kingdoms." Again: whoever plants to a considerable extent, becomes a benefactor to his posterity and to the public; and, therefore, while his work remains the man will not be forgotten. The park at Castle Howard, in Yorkshire, furnishes a striking verification of this remark. On one side of a lofty and noble pillar, erected to the memory of the Duke of Marlborough's victories, is the following inscription:—"Charles, third Earl of Carlisle, of the family of the Howards, erected a castle where the old Castle of Hinderskelf stood, and called it Castle Howard. He likewise made the plantations in this park, and all the outworks, monuments, and other plantations belonging to the said seat. He began these works in the year 1702, set up this inscription A. D. 1731:—

"If to perfection these plantations rise—
If they agreeably my heirs surprise,
This faithful pillar will their age declare,
As long as Time these characters shall spare.
There, then, with kind remembrance read his name,
Who for posterity performed the same."

KYLOE CATTLE.

The Highlands and Islands of Scotland have a very mixed breed of cattle, known under the name of "Kyloe," apparently descended of one common parentage—the diversity of breed being the result of food, climate, and management.

When the Romans first conquered Britain, the Celtic portion of the inhabitants were possessed of large herds of cattle, on the produce of which they lived, with what wild animals they could procure in addition from hunting. Some time prior to the landing of Cæsar, the Belgæ—a Teutonic race—who occupied the southern provinces, having driven the aborigines with their flocks and herds into the interior, had introduced the culture of the soil; but the latter preferred and chiefly led a pastoral, hunting, and warlike life.

From this dependence of the Celtic clans on their herds and the chase, it is easy to trace the migrations of the Kyloe to the North from the continent of Europe, and from the plains of the Euphrates and Tigris to the West.

Before arriving at the Highlands, the original breed must have undergone considerable change from the influence of soil, climate, and circumstance. This is manifest from the wideness of the two extremes—Mesopotamia and Caledonia. But without going to the East, the change from the fertile meadows of England to the wintry privations of the North must have been productive of no ordinary results.

No doubt the change under the pastoral system of warlike times was less than it now is under the improvements of the arts; but granting the full force of this, it is nevertheless manifest that such must have taken place; and this very fact gives rise to several important questions, no less in the improvement of the Kyloe breed than that of Shorthorns, Devons, and Herefords. For example:

Are not Shorthorns, Devons, and Herefords descendants of the Kyloe, or ancient ox of the Celtic tribes? The answer, that the Shorthorns were imported from the continent of Europe, is unsatisfactory; for so were the Kyloes themselves. The difference of breed may be accounted for by the influence of art, on the one hand, on the Shorthorns before importation, and the influence of warlike times and privations of a highland winter, on the other. If there is either value or honour in purity of blood, we must therefore, if such is true, trace it to the Celtic breed.

The Kyloe is a degenerate race, owing to the great hardships it has endured; and, therefore, although both are descended of one original stock, the latter is consequently the purest blood.

Favourable as the above conclusion is towards Shorthorns, and parallel to what is generally entertained of this highly-honoured breed, it will yet be found a very difficult task to substantiate it by fact; for all accounts of their original, as imported, admit the breed to be coarse in quality, though of great weight; whereas our best Highlanders possess great merit both as to symmetry and quality of meat; while their weights under equal management are on a par with Devons, and generally preferred by butchers to heavier. The only point where they fall behind the Shorthorn, Devon, and Hereford, is early maturity; and this, we aver, may be obtained by the use of proper means in their case, as it has been in the others.

Justice, we are afraid therefore, has not been done to the Kyloe in this respect: no doubt, in very many cases early maturity would not be easily reconciled with management in our Highland glens, from the difficulty of getting a sufficiency of winter keep under the natural system there practised; but the natural system will not do with early maturity in the South, any more than in the North. Neither Bakewell, Collings, nor any other improvers of breeds, for instance, were able to effect such on the natural system, art in every case having to triumph over innumerable difficulties; while in the highlands of Scotland little or nothing has been permanently done towards the early maturity of the Kyloe by artificial means.

This evidently arises partly from the success which has attended the introduction of improved sheep husbandry, and partly from the greater obstacles which Nature has thrown in the way, both as to the early maturity of the Kyloe, and the improvement of the soil so as to procure a sufficiency of food during winter.

Of the successful husbandry of sheep in the North we cannot say a word at present beyond the simple fact that it is no doubt destined to form a very formidable rival to that of black cattle, especially slow feeders, in many districts. At the same time, there are districts too moist for sheep-farming with profit, but which are otherwise for the ox; while Art may even render dry soils and climates better adapted for the latter than the former, as will subsequently be shown.

From being so long the associates of that portion of the Celtic family which had fled before the face of civilization, so to speak, from the cradle of the human race to the confines of Western Europe, rather than submit to the conqueror's yoke, the Kyloe breed had doubtless been stamped with physical characteristics peculiar to the many trying exigencies in which it was thus placed, rendering it more difficult to improve than the herds of their Teutonic neighbours, more disposed to the peaceful pursuits of agriculture. From being, for example, continually surrounded with wild animals, both before and after their first arrival in Britain, and the wildest of all animals, predatory and hostile neighbouring clans, and from bulls fighting with one another and scrambling among hills, they would be brought up continually on the alert from the time they were calves, and under circumstances which would be productive of a quick eye and ear, a prominent or elevated head, great strength of neck and fore-quarters, and development of bone and muscle for active habits generally. And this is just what we find exemplified in the breed; for all these characteristics are possessed in a very high degree.

To arrive at one common centre of perfection, or mean, as to symmetry and quality of meat, between extremes so wide asunder, must doubtless be by a somewhat opposite course; and yet the winning-post, or grand object in view, in each case is nearly similar. What, for example, did Mr. Collings see in "Hubback" when a calf, to induce him to lay the foundation of an improved breed? An aptitude to arrive at early maturity was doubtless the leading characteristic: for at that period this was a point which the breed had not yet attained; it being then not only bulky and coarse, carrying a large weight of all the inferior parts, but a great consumer of food, and as long in arriving at maturity as the Kyloe. To obtain early maturity, and a more favourable development of parts, Mr. Collings doubtless sacrificed weight; and the known defects of the progeny of "Hubback" exhibits, is evidence sufficient to prove that he himself was not so perfect in all points as his fortunate purchaser might probably have wished: still he was a departure from the leading characteristics of a degenerate parent-stock, and an approach to an intermediate type between the two extremes in question as to the above qualities.

The practical question, therefore, is to bring up the Kyloe to meet his rival in this march of improvement, and if possible reach the winning-post first. That the latter has hitherto made the greatest progress is plain; but that he is nearest to perfection, or that state capable of manufacturing the greatest quantity of beef of the best quality from a given quantity of produce, is a proposition not so easily proved; for as yet the best breeds of the former return the best quality of butcher-meat, and not the least profit to the farmer for their keep. This conclusion as to profit, however, it must not be forgotten, is only true of the Highlander, which has already passed the first stage of improvement, being in a similar position to what the Shorthorns were when Collings found "Hubback," for the vast majority will not pay the grass of high-rented lands.

Before proceeding to select our Highland Hubback to make a fortune, we must bear in mind that public opinion of late years has undergone some very important modifications in favour of our problem; for at all our exhibitions of breeding and fat stock the smallest animals are carrying off the prizes, while the smallest of the three improved breeds—the Devon—takes the lead as the first class. In other words, more attention is being paid to the quality of butcher-meat, and economy of food consumed in its manufacture, than was the case in Collings's day. This inclination of the public mind is certainly encouraging, sufficiently so to raise a hope that the Kyloe may yet occupy as prominent a place in the North as the Devon does in the South, if the two do not stand beside each other as the best breeds to the grazier, as they already doubtless are to the family butcher.

To obtain early maturity, no doubt a sacrifice of weight must be made in the case of the Kyloe, as has been done in that of the Short-horn, Devon, or Hereford. Our readers, however, are not to infer from this that we propose breeding from the dwarfiest of Highland cattle—quite the contrary; for the stock to be selected from must first be improved and brought to its greatest size, as was the case with the above breeds, and then the choice be made of an animal shewing an aptitude or disposition to early maturity; and from our experience in breeding and selecting calves to attain this characteristic, with quality of meat and symmetry at the same time, we aver that such an animal will be under the average size of its breed. There may be exceptions to this rule, as there are to all others; but we have rarely or ever seen symmetry and quality accompany approximations to such, while they are invariably great consumers of food.

In this selection, the master work lies in securing an animal which will convey to its progeny, as hereditary qualities, its own peculiar physical characteristics—those for which it has been chosen from the herd as the foundation of an improved breed. That imperfect specimens may be drawn is no more than reasonable to expect; and therefore breeders have no right to despair of success, although such may be realized; but so long as no rational or well-founded reason can be given, that the Kyloe is not subject to those laws of nature which have improved the Devon, Shorthorn, and Hereford, there is obviously good grounds to hope for ultimate success; indeed, Nature, in plain language, is more in favour of the Kyloe than the Shorthorn; for it would be unreasonable to attribute to the flat-sided, large-shouldered animals of the latter breed, when first imported, with coarse necks and heads, and all the inferior parts disproportionately bulky, purer blood or pedigree than the former. In short, the improvement of the Shorthorn, Hereford, and Devon is the work of English farmers, and therefore we may be allowed to express a hope that their northern neighbours, not less celebrated in agriculture, will turn their talents to equal advantage in the improvement of the Kyloe.

When so much is being said of draining, guano-water, and ryegrass, it is an easy matter, at least at the fireside, to get over the difficulty of winter keep for improved breeds of Highland cattle, our last proposition. If twenty tons of hay, for instance, can be had in Ayrshire, from one ton of guano, with a sufficiency of moisture to bring it to the roots of plants in a soluble form, or even half that quantity, it is difficult to say what the more fertile and promising on the Moray, Beauley, Cromarty, and Doroch Friths may produce; while throughout the whole of the North, there are large areas of land well adapted for this species of husbandry.

In other cases, root crops in abundance may be grown under proper drainage, manuring, and management, and in many cases are already being so; while in all cases where this is impracticable, large crops of furze or whins may be grown, and cut in winter, for house feeding.

Good household accommodation, again, requires less food; and nowhere is this more necessary than in the North. Unfortunately, at present, Highland cattle are supposed to stand any weather (?), and where reared in stormy situations, actually do not thrive so well in a warm comfortable feeding box, such as would suit a Shorthorn, as in an open yard; but those who conclude that this arises from the nature of the animal, are miserably mistaken, for the difference between the two will be found in the thick coat, with which Nature has clothed the former. The Kyloe, for example, is just as fond of a dry comfortable box as the shorthorn, only as he has got a thicker coat, he requires some degrees less temperature in his house on that account, and the latitude of the North will generally do more than balance differences of this kind; while the more he is improved and made subject to art, the more dependent will he become on good household accommodation, because of his finer coat.

In the economy of food and management, the grand object is to bring summer and winter feeding to a state of equality; *i. e.*, to grow a sufficiency of winter keep for the summer stock, so as to prevent the losing of flesh and even growth during the former period. At present what the kyloe gains during summer he nearly loses during the ensuing winter; so that both summer and winter keep is nearly lost, and also the expense of management.

The profit which would be derived from the improvement of the Kyloe as proposed, will thus be seen to be incalculable; sufficient, we hope, to awaken a spirit of enterprise among the breeders of this invaluable race of cattle, acknowledged by all parties to yield the best butcher-meat slaughtered. Among the bleak hills and islands of the North, the skill and capital of the farmer have doubtless difficulties in the way of success which those of the South do not experience, but none which an increase of science and capital cannot remove.

ON THE BREEDING OF HORSES.

BY CECIL.

There are few subjects upon which Englishmen differ more essentially than those which relate to horses; and their diversities of opinion are not confined to any special objects, or to any of the various purposes for which the animals are employed. Strange predilections arise in favour of candidates for fashionable and attractive races, many of which are constructed on the most tottering foundation—an allusion which may often be applied either to the fancy or the favourite. In the choice of a hunter the most extraordinary properties are not unfrequently regarded as perfection. One gentleman sportsman, from an unconquerable predilection for substance, overlooking the conformations which are essential to power, is known to select a huge beast as slow as his progenitor, the cart horse, whereon he perches himself, with the happy delusion that he will be carried in triumph through the deep mire, and, to his unutterable dismay, he finds himself on the first fitting opportunity, most inextricably stuck fast in the mud. But our persuasion would have no more effect on our friend than his upon his horse; neither is it possible to convince him that he has made a bad purchase, or that the animal is totally deficient of the characteristics of a hunter: it is the creature of his choice, and he will not suffer his judgment to be impeached. Another person delights in speed, and, falling into that extreme, bestrides a weedy, mad-brained, pulling wretch from the racing stables. So it is with the roadster. A corpulent specimen of humanity rejoices in a bone-setting cob, that shakes his liver, and promotes digestion; while his spare and light companion reposes the most felicitous confidence in some weak infirm creature, without the slightest pretensions to action, inculcating the idea that the rider contemplates suicide on the most fashionable, interesting, and sympathising principles. From these premises we may gather many hints suggestive of elucidation. Preconceived opinions are often difficult of eradication, however circumstances may change to alter their positions. For many years it has been a prevailing opinion, that training and running horses at the juvenile age of two years abbreviated the period of their continuance on the turf; and also that it tended to the deterioration or degeneracy of their progeny. Listening to such arguments, the opinion becomes extremely confirmed, till comparisons and observations change the decision. Treated as horses were in their infancy in bygone days, there can be no doubt that training colts at two years old was calculated to injure them materially; but when breeders discovered that great profits and advantages were to be gained by this precocious system, they adopted measures calculated to render their young stock better able to sustain the ordeal. This is readily explained. By sustaining the foals with food abounding with those elements which supply the system with bone, sinews of a firm texture, and muscle of the best quality, the two-year-old of the present day is an essentially different animal from what a juvenile of a similar age was at the commencement of this century. Our grandfathers told us that no food but grass was suitable in the summer for an animal of tender age: thus their systems were debilitated, and very few were capable of bearing the exertion of training. It is only within comparatively a few years that the practice has been abandoned of supplying hunters with green and succulent herbage through their months of respite in the summer; and when the plan was first introduced, though only partially, how vigorously it was opposed! It was denounced as a cruelty, an error in judgment, and all the evils with which the horse could well be annoyed were, with marvellous perversion, represented as his greatest enjoyments. A four-year-old colt, reared as they were in olden times, fed exclusively on green herbage, when it could be procured, was, in his nature, and in the component parts of his frame, scarcely, if at all, more matured than the two-year-old of the present day. The agriculturist has discovered this principle, and adopted it, in the management of his feeding stock, although he has not as yet extended it to the horses which he breeds with the attention it claims. Referring back to the foals of the year 1825, a year notorious for the production of superior horses, the stud book supplies us with the pedigrees of about six hundred, of which only one hundred and forty made their appearance as two-year-olds. In 1852 about one thousand foals were produced, four hundred of which came out at two years old; the proportion is manifestly in favour of the last generation, an indication that the stamina of the thorough-bred horse has improved simultaneously with the mode of treatment. When opinions are expressed that our breed of horses is deficient in stoutness, stamina, power, and speed, they excite inquiry. With such samples as Virago, Rataplan, Teddington, The Flying Dutchman, Surplice; and, going back somewhat further, to Venison, Harkaway, Sir Hercules, whose progeny is unexceptionable, with a host of other horses of unquestionable excellence, it is rather difficult to conjecture at what period the English race-horse manifested a superiority over them. Every age has had its hero, and in every age there has been a lot of worthless, weedy, disreputable wretches. That there is a great number of the latter foaled annually cannot be denied —there are so many bred; but there is no evidence that the best horses of the present day are not quite as good, or better, than they were in bygone years, or that, by comparison, the numerical force of the rubbish predominates. The encouragement to breed race-horses has increased at a most extraordinary rate—at railway speed; and the results of last year's sales of yearlings must prove a still greater inducement to speculation. Three juveniles, each producing 1,000 guineas and upwards, is without precedent, and reminds us of 1,010 guineas having been given in 1837 by the Marquis of Exeter for the late Sir Mark Wood's colt by Rowton or Cetus, out of Camarine. The average prices of the yearlings offered for public sale in 1854 amounted to upwards of 187 guineas each. While the number bred annually for racing purposes is on the increase, the most extraordinary prices have been given for those which were promising. Surely this does not indicate degeneracy. Much has been urged in condemnation of the rules and customs of racing; but the time has not arrived when human ordinances shall be immaculate. Doubtless there are many items which will bear amendment; but, perhaps, in amending some of them, openings might be made for fresh objections. Handicaps are faulty engagements, despite many endeavours to improve them, but they seem to be on the list of incurables. The scale of weights is a subject which might readily be amended, and, if done, it would have the good effect of excluding the worthless weeds which are too frequently kept in training, but which serve no other purpose than to increase the number of starters at nearly every race meeting in the kingdom. The abolition of heats was a great boon to owners of horses, and frequenters of races; but, unfortunately, very short races have frequently been substituted to fill up the vacancies. Persons who are interested in the management of provincial meetings are necessarily anxious to render the stakes attractive; thus short distances and light weights are proposed, but at some of the most important meetings the olden practices are not materially altered. Take the Doncaster Cup, for example, the weights for which are actually higher than they were forty years ago; the distance has been reduced from four miles to two and a-half, but the latter affords a journey quite far enough to test the lasting properties of the horse, if the pace be good throughout. It is not with such distances that there is any cause to cavil; it is when all-aged horses are encouraged to run for races less than a mile that the evil predominates. The Cups at Ascot still preserve their dignity, both as to weights and distance, and if we look to the returns of the running on the royal course five-and-thirty years ago, there was only one race the distance for which was four miles.

The material from which horses of the useful kinds can be produced is still in existence; the principal object is to select suitable crosses, and it is a fortunate circumstance for breeders of these kinds that the most valuable sires for the procreation of racing stock are not necessarily the most eligible to become the sires of hunters and roadsters. The proportion of sires devoted to the aristocratic harems of the turf is limited to about 170; but there must be more than double that number whose services are confined to mares of less gracious lineage. How many of them are worthy of patronage, it would be difficult to determine. Those which possess the hereditary imperfections of bad fore legs or a musical reputation, of which, in both classes, there is a numerous family, cannot be rejected with too much determination. The time of year is approaching for those who possess useful mares to decide whether the present demand for horses will not induce them to try their luck. Prospects were certainly never more propitious, whether we regard the requirements for private employment at home, for the foreign markets, or for the use of the cavalry. In a former communication, the number of horses, for which assesed taxes were paid in the year 1850, was enumerated, with a view to form some estimate how many could be mustered. From further investigation I find, exclusive of horses used solely for the purposes of agriculture, the number for which exemptions were claimed amounted to 189,437, and those partially exempt from duty to 75,245, thus increasing the total to 431,142, which I confidently believe is still but a portion. Statistical evidence on this and all other subjects connected with the production of the land is much wanted; but to be complete and satisfactory the classes of horses should be distinguished.

Although it is unnecessary, for the purpose of breeding hunters or roadsters, in which category we may also include chargers and cavalry horses, to make choice of such highly-proved sires as Birdcatcher, Bay Middleton, Melbourne, Surplice, Pyrrhus the First, West Australian, or The Flying Dutchman, the value of what may be denominated hunting blood cannot be too strongly inculcated. It is a fact worthy of recognition that several horses which have proved themselves worthless as sires in the stud-book have been invaluable for producing a progeny distinguished in the hunting field. Master Henry and Spectre had many of the best thorough-bred mares of their day; but they never produced a race-horse. Mameluke, half brother to Master Henry, was equally unfortunate in his progeny; yet Master Henry and Spectre were the sires of many splendid hunters and riding horses. The Orville and the Blacklock blood has proved itself excellent in both departments; and if a horse possesses sufficient power, with suitable action, a good constitution, freedom from hereditary blemishes, who, on his probation, does not beget racing stock of high pretensions, it is more than probable he will prove his value as the progenitor of hunters.—Sunday Times.

HOW TO ECONOMISE COALS.—Get some fire clay in the moist state, and spread it over the lower bars of the grate on which the coal rests. The clay will form a solid mass as hard as stone, and when thorougly heated will throw a great heat into the room; if there is a tolerably good draught in the fire-place, it will not be very much interfered with, and a mass of clay may be introduced sufficiently large to fill up half the grate: if kept away from the front bars, so as to allow coals to fall down in front, the clay cannot be seen when the fire is lighted. For this reason it is a contrivance far superior to "cheeks," false bottoms, &c., which are unsightly and diminish the heat of the fire. The clay contrivance, on the contrary, reduces the consumption of coals to about one-half, without any loss of heat. Combustion goes on more slowly from the draught being checked, and one half of the fire is a heated mass which cannot burn away. This will be found a good mode of dealing with large old-fashioned grates ingeniously constructed for the purpose of sending the maximum amount of heat up the chimney and minimum amount of heat into the room.—Home Journal.

EXTRAORDINARY CONVICTION UNDER THE GAME LAWS.

In cementing that union between landlord and tenant upon which their mutual prosperity is so mainly dependent, either should be prepared to give way a little. There must be some better guide than the mere letter of the law to engender that good feeling which should exist between them. As it is, few, after all, considering their relative positions, have more sympathies in common. While in many other classes men only speak and meet on matters of business, the very amusements of these bring them more and more together. If the country gentleman, in his birthright, is more or less a sportsman, the farmer holding under him is often enough something of a sportsman too. We speak advisedly when we say there is no rural gathering which tends more directly to a good understanding between landlord and tenant than a meet of the hounds, or a day with a coursing party.

It strikes us there can be no great sin in encouraging a little recreation of this kind. We believe, indeed, on the other hand, that it must be to the advantage of either to give way a little here. Suppose "the Field" have spoilt a bit of quick, smashed a row of hurdles, or over-excited a few wethers, there is no great harm done after all; and there may be far more good than one might at first be inclined to acknowledge. It is the privilege to indulge himself in these manly pursuits which so endears the English gentleman to his estate and his home. It is in the practice of these that he comes the better to appreciate those around him; and that he, in turn, will give way the more heartily and cheerfully to the wants and tastes of others.

And yet in the face of this nothing has done more to breed differences between the two classes than one certain variety of field sports. The public-house orator, or political tract distributor, flies to nothing so readily to produce dissension and ill-will as to the game-laws. He unites tenant and labourer in one cause as the martyrs to so palpable an injustice. At least he once did so. Common sense, however, and gradual enlightenment, are affording him less and less opportunities in this wise. We have reason to hope and believe that the harsh, selfish, and oppressive system of game preserving is going more and more out of fashion. The slaughtering thousands of head in a day is not sport, but trade—a trade carried on at the expense of the agriculturist, with the produce openly transferred to dealers and fishmongers. We repeat, that it is going out of fashion. One now reads such astounding paragraphs—so many hundred hares, and so many brace of pheasants, to two or three guns—with disgust and derision; for we know too well how, and at whose expense, this is accomplished. Sensible landlords, however, are day by day giving it up. Over-preserving is rapidly on the wane. Even the tenant at last has some privileges with the game on his land; while the owner has still every opportunity for fair sport.

Would that we could class all here! Unfortunately there are still left amongst us too many specimens of that grasping, tyrannical, and bitter spirit which would at any time rather lose a friend than a pheasant. A monomania, for it is nothing less, which drives the gentleman to acts his better nature must ever be ashamed of. In support of this he becomes the meanest of spies, the foulest of bribers, and the worst of oppressors. Before this he bows him down in blind idolatry, ready to sacrifice his own self-esteem, the good opinion of his neighbours—everything, in a word, to preserve—his game! Need we ask our readers if it has been so? We think we are justified in assuming that we do not speak too strongly on what has past. We would not say that it is so still, but rather let a plain story speak for itself:—

> "A case which excited an immense degree of interest in the lower division of Gloucestershire was heard at the Petty Sessions, at Berkeley, in that county, on Tuesday last, the sitting magistrates being the Rev. J. Seaton Kerr and Major Weight. Mr. James Cox, a highly-respectable farmer, of Berkeley, was summoned by John Powell, gamekeeper to Earl Fitzhardinge, for shooting a pheasant on his own land (he being a certified person), between sunset of the 4th and sunrise of the 5th of December. The defendant was formerly a tenant of Earl Fitzhardinge, but now rents a farm under the Rev. Sir E. Colt. The chief witness called to prove the case was a labourer named Nash, who deposed that on the 4th of December, he being then in the service of Mr. Savage, he was sent by one of the young ladies to Mr. Cox, to ask him to come and shoot a pheasant which had gone to roost in a tree in the nedgerow between a piece of ground called Scotchells, in the defendant's occupation, and another piece called Great Gastons, in the occupation of one Mr. Paralow, who had let the game on his farm to Earl Fitzhardinge at £10 a-year. The defendant did not arrive at the spot until about 9 o'clock at night, when, standing on his own land, he shot the bird, which fell on Mr. Paralow's land, and was thrown over the hedge to him by Nash. When cross-examined Nash stated that the keepers of my Lord had been at him repeatedly about the transaction, and he had been taken into his Lordship's service, as under-keeper, a fortnight after the occurrence, at 14s. a-week wages, his wages at Mr. Savage's having been 10s., with an intimation that it would shortly be reduced to 9s. He admitted that he had stated to a certain person that unless he made this statement he should lose his situation.

> He produced a branch of the tree from which the bird was shot, and an under-keeper, named Parker, deposed that, dropping a line from this branch as it grew on the tree, it fell three or four feet beyond the ditch on the Great Gastons piece. Mr. Paralow, the tenant of Great Gastons, deposed that he let the game to Earl Fitshardinge, as already stated, and that on one occasion Mr. Cox asked him if in case he shot a bird, and it fell on his (Paralow's) land, he (Paralow) would allow him to pick it up. Witness then told him that he might do so. This admission was received with acclamation by the crowd of farmers which choked up the justice-room. For the defendant it was contended that the act of the 9th George IV., under which this information was laid, was intended to apply alone to night poachers, and not to certified persons, who were not restricted as to the time when they should sport. The magistrates, however, convicted the defendant, on the ground that the portion of the tree where the bird was shot overshadowed the land of Paralow, and that his right extended to all from the ground to the sky. They, therefore, sentenced the defendant to a month's imprisonment, and to find sureties afterwards."

Mark by what means we essay to maintain the high character of a sportsman and a gentleman! See the one witness systematically enticed from his honest service, to distinguish himself no doubt in turn as an under-keeper. Trace him, too, when once in harness, the threat held over him that if he does not prove this case he will "lose his situation," to become most probably utterly destitute. Few take kindly again to an informer. Picture "My Lord's" own servant swearing to the bend of a branch on a tree, and thence to "the three or four feet" between ground and sky that "My Lord" has a right over! Let us endeavour to associate in our mind's eye all this, and then let us try our imagination a little further, to find the judges it could convince. They are already at hand. The one witness "my Lord's" keepers have been prompting and entreating for this month or two—the one witness, openly honoured with a place to swear to something, and as openly threatened if he did not do so! Would any court of justice in England have dared to rely on evidence thus obtained? Would any prudent man have dared to go into court with it? But a sportsman "knows his country." There are two brave justices ready to see "my Lord" righted—all honour to them! How nobly disinterested, and with what untutored honesty, does the labourer Nash come before them! With what praiseworthy accuracy does the keeper Parker swear to a foot or two of space "between earth and sky" as "My Lord's" own right! To be sure Mr. James Cox, "a highly respectable farmer," shot the bird from his own land, and had permission to pick it up from that of his brother farmer. But what is this compared to the outrage on "My Lord's right between earth and sky"? Nothing—less than nothing. These people may have their own land, and their neighbours' courtesy, but they must be taught to distinguish better between what is and what is not their own. Between earth and sky is "My Lord's." My lord's own servant proves it. The case is clear and satisfactory; and a highly respectable farmer is "sentenced to a month's imprisonment, and to find sureties afterwards"!

Can this be true? Could any one for a moment conceive that high respect for the law by which Mr. Cox has been hunted down? If it be true, and there be any spirit left in that "crowd of farmers which choked up the justice room," let them look to it. Let them remember the decision of these Berkeley justices. Let them ever bear in mind what "My Lord" has claimed and proved—"his right between earth and sky." Let him have his pound of flesh, and let him have no more. "My Lord" is a sportsman in more ways than one. He has to ask courtesy and consideration, if he cannot show it. As a master of foxhounds he is on other men's land—"between earth and sky"—on the land of "highly respectable farmers," almost every day in the season. Let him be judged out of his own mouth. Let him be met with his own reading of the law. Let him hunt as he shoots, strictly on his own right—between an earth and a sky of his own. We should be the last to cramp so noble and national a sport as fox hunting. We should be the last to urge the farmers of this kingdom to give it anything but their hearty good will. But we should be equally the last to uphold in any way any man who interprets the practice of field sport as it appears to have been here.

THE OPPRESSIVE INFLUENCE OF THE MALT-TAX.

The effect of direct taxation has never become more apparent than at the present moment. The malt-tax has now become so oppressive that it exceeds in amount the value of the barley upon which it is imposed, and has influenced price to such an extent, until that article has become cheaper by many shillings per quarter than its proportionate value in relation to wheat and other grain indicates; and the result must inevitably be highly injurious to the grower.

We have always maintained that this tax upon barley was not only oppressive, but unjust to the farmer; and, now that he has been brought into competition with the foreign producer, to place an additional amount of duty upon it, when already more highly taxed than any other native production, renders the exaction tyrannical and cruel, inasmuch as it proves to both farmer and labourer that their interests are not fairly considered, but that every opportunity is taken to heap injustice upon injustice without the slightest reluctance or repugnance whatever. "Hit him again; he has no friends," is the feeling that appears to exist, notwithstanding all the calumny that has been already heaped upon him.

Whenever a tax, as in this case, is imposed upon an articleor material of manufacture in its first stage, that tax, from its payment, becomes added to the cost of the article in its next stage, and is thus further increased in a trading point of view, exactly as interest and return upon capital are concerned, and so on through every successive stage, until it reaches the consumer; and if from the first cost of the malt a profit of 40 or 50 per cent. is derived, that increase takes place equally upon the duty as upon every other portion of capital invested. Assuming, by way of explanation, that with barley, less the duty, at the present price, that malt could be made at 40s. per quarter, and that each quarter would produce 120 gallons of beer, the cost would be fourpence per gallon upon the quantity of malt used; add 50 per cent. profit, and it brings it up to sixpence per gallon. But as the duty is equal to the value of the barley in point of amount, that which is sixpence in the one case becomes a shilling in the other, thus doubling the value of one of the indispensable necessaries of life to the working population, as well as inflicting an irreparable injury upon the cultivator of the soil.

Upon the act of Mr. Gladstone, by his imposition of an additional duty, we are not disposed to remark; it is part and parcel of the same line pursued by himself and contemporaries towards the British farmer. But we may be allowed to ask in what the justice consists of imposing so large an amount of tax upon an indispensable necessary of the people, unless it was to convince the working classes that their patience under the heaviest infliction of tax known in this or any other country was to become the prelude to a still greater infliction—by allowing it to out-do even the tax upon tobacco and tea, although foreign productions still equally indispensable to them, and, conjointly with the malt tax, paying nearly one-half of the yearly expenditure of the government of this kingdom? Such is the force of habit and custom, that the most enormous impositions once fully established go on with the people for long periods of time without reflection or disposition to escape them. So long as twopence-halfpenny produced a pint of beer or porter, no one thought of the large amount of duty it embodied; but as soon as an attempt was made to impose an additional halfpenny per pint, every one expressed his indignation, and resisted it. But if before payment even of twopence-halfpenny every one had been compelled to divide that sum, and to pay one moiety as tax and the other as for the article, he would soon desist using beer to any considerable extent, or at once set himself about getting rid of the burthen; for, dear as provisions undoubtedly are, place a loaf of bread at eightpence, a pound of meat at sevenpence, and a quart of beer at fivepence, and estimate their relative values, and the effect of the duty will at once be seen in its undue proportion.

The relation that barley bears to wheat, in point of value, is as two is to three; but at the present moment it rates in about the proportion as one is to three. But with the duty added it assumes its true relative position.

Whatever may be said of taxation, and however difficult it may be to inflict taxes, it has always been held by the greatest politicians as unwise to tax the staple productions of a country; and, on the other hand, it would be still more unwise to tax those articles that enter into the cost of production of all others, whether for our sustenance or clothing. And, therefore, we hold it would equally be as just to tax flour and meat as it is to tax malt, the next prime article of consumption of the labouring classes.

A volume might be written showing the necessity of its removal, both as regards the consumer and producer, as it will doubtless turn out hereafter that the great increase of duty imposed at the present moment will not realise so large an amount of revenue as heretofore. Upon this point we are convinced, from the information that reaches us through every quarter; and we therefore maintain that in proportion as the duty becomes diminished the consumption will be increased, and thus a channel would be opened for the large quantity of malting barley produced in this kingdom, and for which, in many districts, a market can scarcely now be found. But, setting aside all class interest, we base the necessity of the repeal of the largest amount of this tax upon the plea, that by doubling the cost-price of beer an injurious monopoly has been created, by which, in addition to the tax itself, the price of a wholesome beverage has been almost doubled to the working population of this kingdom.

METROPOLITAN DAIRY FARMING.

A sufficient supply of good milk for the rapidly-increasing millions of the capital is annually becoming more difficult to be obtained; while the present character of cow-hovels, and management, generally speaking, is incompatible with the health of the neighbourhood and that degree of sanitary reform which public conviction now considers essential to public health; consequently a reformation of dairy farming in the metropolis is involved.

In discussing such a work it will be necessary, owing to the rapid march of improvement at the present moment, to look a little beyond existing circumstances, or even what they may appear to some to require, both as to the management of cows, including feeding and household accommodation, with what machinery such may require.

Cows, to enjoy good health and give the best milk, require a purer atmosphere to breathe than what can be had within the central districts of the capital or in the majority of its cow-houses, and therefore the question arises should cow-houses be situated in the suburbs, and the milk taken to the centre in light spring-carts, as required? Or, should they be placed at a greater distance on farms where the sewage matter could be applied (supposing means discovered to render this system practicable), and Italian rye-grass and other rapidly-growing plants well adapted for cow-feeding grown, and the milk sent in daily to town by railway? Or, should large cow-establishments be erected in healthy localities along our suburban railways, so that the Italian rye-grass and other products of sewage manure could be supplied to them by railway vans got up for the purpose? Or would a combination of these several plans be better than any of them individually? Or, lastly, would the removal of the sewage with the consequent purification of the river, the removal of dilapidated buildings with the widening of streets, and the erection of better houses for both man and beast, with an abundant supply of pure water, render the centre of the capital as healthy and economical as the suburbs for dairy farming?

In answering these questions, attention must be paid to the economy of labour, capital and manure, with the sanitary state of the metropolis. When put together, they form a work of reformation so connected, that the circumstances of the one affect those of the other, rendering it probable that a combination will ultimately be the result. At the same time, the success of any one of them will very much depend upon local circumstances, and the amount of skill and capital which dairymen are capable of bringing to bear upon it. In this respect they are not exceptions from the common rule.

In order to take a more practical view of the subject, let us glance at the facts of the case. Let us suppose, for example, that the metropolis is circumscribed within a radius of five miles, which is probably not very far from her present area, *being about seventy-eight square miles!* And, as the health of the suburbs demands that the sewage matter be carried some considerable distance, beyond this five-mile radius, let it be discharged beyond a radius of ten, which would give a ring of about 235 square miles for market gardens and detached residences. And if we farther suppose that an increase of radius to the extent of other five miles is required for working up the sewage, then it would give another ring of about 392 square miles under Italian rye-grass, &c., &c. We should thus have three radii of five, ten, and fifteen miles from St. Paul's, giving a diameter of thirty miles, ten of which would be houses, streets, &c., ten market gardens, and the remaining ten under sewage for dairy, hay, and other farming purposes. The three divisions may be tabulated thus:—

	Square Miles.		Acres.
Metropolis..........	78	....	49,920
Market gardens, &c...	235	....	150,400
Dairy farms, &c.	392	....	250,880

The first of these areas would stretch from Dulwich on the south to Highgate on the north, and from Blackwall on the east to Shepherd's Bush on the west, and will very soon be all under bricks and mortar. The second, from Croydon on the south to Enfield on the north, and from Erith marshes on the east to Brentford on the west, the greater portion of which is laid out for building purposes, and no small part of it already occupied; and the third, from Epsom on the Surrey side to Tunford on the opposite, and from Dartford to Watford in the transverse direction: within which we aver that landlords are generally looking prospectively to "bricks and mortar" for future returns, in preference to sewage manure, even were the latter given them for nothing.

We may just remark, in passing, that these divisions are quoted because given on a "map of the environs of London" before us. As the capital increases, the different radii can be extended; or if the middle ring appropriated to market gardens is too small, another mile of radius can be had from the third, leaving it still large enough to consume all the sewage; or any other radius may be assumed, as circumstances require. The circular rings, at the best, are but imaginary: the facts at issue being the length of pipes required to apply the sewage matter of the capital to the hungry soil of the surrounding country.

The largest length of main sewage-pipe, it will thus be seen, need not exceed a radius of fifteen miles; and as a large amount of the sewage could be made to flow towards the circumference of the capital, it might, consequently, be thrown across the ring for market gardens with a length of little more than five miles; so that engineering obstacles in the way of application disappear as we approach them, however insurmountable they may seem in magnitude when seen from a distance.

If with a liberal dose of sewage twenty tons of Italian ryegrass hay could be grown, or its equivalent in grass, or any other vegetable product, it is manifest that such an increase of crop would do far more than pay redeeming interest of the capital invested in pipes, hydrants, &c., within the short period of twenty-one years; so that the financial department of the project, according to this view, would be a lucrative one.

Such, then, being the facts of the case, as stated in the last two paragraphs, the question to which we are naturally led is—Why have our engineers and capitalists done nothing in so promising a concern? for, even at half the above crop, it is manifest that the thing would pay.

There are other obstacles, however, to be got over, besides mere length of pipe and increase of produce, for the question of profits arising from building leases presents a barrier of still greater magnitude; while the capital would be surrounded with a pestilential zone five miles in breadth, whose atmosphere would rise still higher, affecting the sanitary condition of the adjacent properties on each side, and, consequently, the value of building lands. In passing through this sewage region per railway or other mode of locomotion to and from the metropolis, it would, no doubt, be a pleasant thing to see twenty tons of ryegrass mown monthly from an acre of land during the summer months—land only yielding half that weight during the whole season at present; but it might not be such an agreeable affair to live contiguous to such a region, where no such benefits were derived. The atmosphere of a single farm under the liquid manure system furnishes no satisfactory evidence of that of such a large area of land as the sewage of the capital would cover. It is a well-known fact that the Edinburgh meadows are a horrible nuisance, and would be much worse were they situated in the warmer climate of the English capital; and although we have no apprehension that the application of the sewage as proposed would be so pestilential as they are, yet it may be such as to affect successful dairy husbandry on the spot. In other words, the atmosphere of such a region might be injurious to the health of cows, and hence the secretion of good milk, so that crops would have to be sent to town dairies.

Of these objections, that of building-leases, with the uncertainty of tenure which it gives rise to, will probably be found the greatest barrier to the application of sewage with the erection of permanent homesteads for dairy cows, as proposed. The cheap conveyance to and from town daily by railway season tickets is giving rise to an anxiety in the minds of all classes to have a country-house within some fifteen miles of the capital; and when we observe the fact that the reduction of doctors' bills and rent does more than cover the expense of tickets, we need not wonder at the rapidity with which country villas are everywhere rising up, adapted for incomes of every grade, while landlords are manifesting equal anxiety to respond to this demand by laying out their estates for building purposes; consequently, who among them can be expected to go to the expense of pipes, hydrants, and erecting houses for cows on lands which in a few years may be let on building-leases, or so studded with villas as to prevent the application of sewage to grass lands between them?

Both these obstacles to progress, however, may be surmounted; for a pestilential atmosphere may be got rid of by underground irrigation, and the other by longer pipes; for as lands adapted for building purposes have a limit, they may also be outreached by such means; so that the remedy in each case only amounts to a little more engineering, and a little more cash, re-opening to consideration our account of profit and loss.

But as the distance from the capital, again, or length of main pipe increases, the value of the sewage as manure decreases, while the expenses of application increase; consequently we cannot proceed very far until we arrive at the limit of profit. Where that point is—whether at the distance of 15, 20, 30, or 40 miles—is a question which experiment alone can decide.

There is, therefore, not only a limit to profit; but within that limit it is inversely as the distance. In other words, there is a point at which the returns of produce just cover the working expense, leaving no profit or interest on capital; and within this, the less the distance from the capital the greater the profit, while the greater the distance the less the profit. For example, if Mr. Mechi's profits, with his tank on his farm, are *nil*, they would be more so if his sewage was applied at the distance of twenty miles, supposing that the limit of building lands. If they were such as to cover the expense of conveyance that distance and no more, there would be no profits, of course, beyond it; but if the limit was at a distance of fifty miles, then profit would increase the nearer to Tiptree Hall the sewage is applied.

The amount of produce, again, and returns from it, will very much depend upon the quality of the soil, houses, and dairy management; for if the latter are good the former may be large, but if bad the reverse.

Beyond the radius of twenty miles from the capital the quality of the soil is very varied; but without entering into details of this kind beyond our limits, there is a large area well adapted for dairy husbandry under the liquid-manure and Italian rye-grass system sufficient to consume the whole sewage of the metropolis, and which would return a large increase of crop at the first application if the quality of sewage is good, without in many cases any previous expenditure in draining and preparing the soil for such a change of culture, beyond laying the hydrants. In the case of underground irrigation a large investment would of course be necessary to prepare the land for sewage.

Cow-houses in the suburbs and metropolitan provinces, are like those of the capital, subject to improvement, generally speaking; and were 100,000 acres placed under Italian rye-grass and liquid manure for dairy husbandry, a large investment would be required in the necessary buildings, as the whole crop would then be consumed indoors. A milk-cow requires a large, well-aired feeding-box, in which she can move about, so as to preserve health and the secretion of good milk, or lie down and ruminate at ease, undisturbed by her companions—what few cows in the metropolis at present enjoy.

However anomalous it may appear, yet such is the fact, that the bad accommodation for cows in the capital arises from dairymen having "done well!" An industrious man, for example, starts with two cows, which he locates in some old cart-shed in an out-of-the-way corner. At first they are healthy, giving good milk, which enables him, by industry and perseverance, to establish a "milk-walk." In course of time a third, fourth, and even tenth cow are wedged into the same narrow space, while the increase of brewers' grains and other edibles, with the increase of dung also, renders the atmosphere almost intolerable. During the summer months he can go twice daily to the grass fields of the suburbs, and milk his cows there, returning to his milk-walk in time to supply his customers at the usual hours. But habit has so chained him to his old domicile, that he cannot entertain the idea of a suburban residence for himself and family, where they would enjoy a pure atmosphere and plenty of room, much less can he count the cost of such for his cows.

Amidst so much brick-and-mortar speculation, it has often occurred to us that large buildings might be erected in different parts contiguous to railroads, &c., where food could be delivered and manure removed, capable of containing a hundred feeding boxes or so for cows, and of being let to dairymen at so much per box; and where improved machinery and apparatus could be brought to bear upon the cooking of food, and the abridgment of labour generally. More than dairymen starting could get their cows kept at livery in establishments of this kind cheaper and better than they do at present, while the quality of food, &c., would secure good health for their cows, and milk for their customers —what neither now enjoy.

In accordance with the above view of things, it is manifest that a more economical subdivision of labour in connection with the dairy management of the capital is practicable, and that, with proper circumspection, this may be effected without injuriously interfering with the private interest of individual dairymen and their families, by separating the manufacturing department of the dairy (the housing, feeding, and management of the cows) from the commercial (the retailing of the milk—the manufactured article—among the consumers), removing the former to some healthy and convenient place in the suburbs, or sewage-manure and rye-grass husbandry district, should experiment approve of such, and giving it to one member of the family, and bequeathing the milk-walk to another, who would receive the milk from his brother at wholesale price. Indeed, instead of such a change being against family interests, it would be in their favour, by effecting a more satisfactory subdivision of the inheritance, while it would improve the health of cows, quality of their milk, and sanitary state of the metropolis; reducing at the same time the expense of housing and management, thus increasing family incomes.

Our last question, the improvement of the health of cows at the centre of the capital, from the sanitary improvements now in contemplation, may be brought as an objection to the above change; but experience is already furnishing a practical refutation to this: for dairymen at the centre, from the greater expense, cannot manufacture milk so cheap or good in quality as farmers in the country, who supply retail customers; hence milk-walks are fast falling into the hands of the latter, and have been doing so since the opening of the numerous railways, and country supply of milk through their instrumentality.

Such are a few desultory observations on a topic now engaging the liveliest attention of the public mind. What we have said of the metropolis is true of almost every other large town, the quality of the soil and climate excepted. Were the sewage matter successfully applied to the cultivation of grass for dairy or hay-farming, a strong competition, it will have been seen, would arise along the different railway lines, between dairy farmers and private villas, for land; and as the latter would doubtless triumph, the former would consequently be thrown backwards into the open country, between the different lines diverging from the capital, so that the main-sewage pipe would require to be in the centre, between the two, rather than along the line of railway, as has often been proposed—at least after getting within the sewage manure district. Of the probable success of dairy husbandry, under the liquid manure system, experience alone can decide, and it certainly says little for the agricultural enterprise of the capital that an experimental farm has not been tried. Of the dairy department of it, there cannot be a doubt of success, and that it might be the means of effecting a very important improvement in the dairy farming of the capital, relieving its overcrowded districts of one of the greatest nuisances, and supplying them with good milk— a luxury which they do not at present enjoy. Into the details of the sewage-manure and Italian ryegrass husbandry we have not gone, but to this subject hope to return, as promised on a previous occasion.

INTRODUCTION OF PLANTS INTO ENGLAND.— Pine-apples were first grown by Rose, gardener to Charles II. Sir Walter Raleigh introduced the potato. Sir Anthony Ashley, the ancestor of Lord Shaftesbury, first planted cabbages in this country, and a cabbage appears at his feet on his monument. Figs were planted in Henry VIII.'s reign, at Lambeth by Cardinal Pole, and it is said that the identical trees are yet remaining. Spleman, who erected the first paper-mill at Dartford, brought over the two first lime-trees, which he planted at Dartford, and which are still growing there. Thomas Cromwell enriched the garden of England with three different kinds of plums. It was Evelyn, whose patriotism was not exceeded by his learning, who largely propagated the noble oak in this country; so much so, that the trees which he planted have supplied the navy of Great Britain with its chief proportion of the timber. Cherries were first planted in Kent, by the Knight Templars, who brought them from the East; and the first mulberry trees were also planted in Kent by the Knights of St. John of Jerusalem. Aubery says that Sir Richard Weston first brought clover-grass out of Brabant. The introduction of turnips, and also of sainfoin, is attributed to him, and his memory is still revered by every inhabitant of Surrey acquainted with his deeds.

CULTURE OF BEANS.

As most heavy-land farmers are at this time, or will shortly be engaged in putting in their beans, it may be well to consider what are the best methods of culture for this crop. Thirty or forty years ago, it was usual to sow beans broadcast over the land, and plough them in: or plough first, and then harrow in the seed; or, when it was intended to plough between the rows for summer cleaning, the land was first drawn into drills or ridges as for turnips, and the beans then sown broadcast either before the ridges were split, or after they were finished. Now, however, either drilling or dibbling is the universal practice; and we should say that, in the principal bean-growing districts, the latter method of planting is most common of the two. The manner of performing the operation depends upon whether the ground has been fresh-ploughed, or has been reduced by harrowing after a winter's exposure. In Essex—renowned for its excellent bean crops—it is common for men to use a single dibble, and themselves deposit the seed (two in each hole, in the newly-upturned furrow); three men following and finishing in one day the work of one plough.

Dibbling may be said to cost generally about five shillings per acre. In Gloucestershire they have a way of hoeing-in beans. The workman, furnished with a bag containing the seed, tied round his waist, makes a shallow trench across the land, and drops the seed; he then makes another trench a foot off, drawing the earth into the first, and so covering the seed. This costs 6 to 7 shillings per acre.

There are very different ways also of drilling beans. One is, to draw the land in "ridges" or "drills," about 27 inches wide, with a double mould-board plough, deposit farm-yard manure in them, drill the seed on the top of the manure, and then cover by splitting the ridges; these are harrowed down before the plants come up. In some parts of Scotland, the bean-barrow is extensively employed, and in order to deposit the seed along every third furrow, is attached by a rope to the hindmost of three ploughs. Manure is carried by men or women from a series of small heaps previously carted in proper rows, and laid in the furrow above the seed; this being considered a neater and more economical plan than to lead out and spread manure upon the surface of the ground before ploughing. Instead of the bean-sower, drawn by a rope, and guided by a man behind it, a newer contrivance is the small bean-drill, attached to the plough-beam in front of the mould-board; and when this is used, the dung is placed in the furrow before the seed, instead of afterwards. In East Lothian the land is ridged as for turnips, and sown by a drill which takes three rows at once.

In many parts of England no peculiar method of drilling is practised; beans being put in with a common corn-drill, having its levers set to any required distance; the land, of course, being properly pulverized on the surface, after ploughing in manure, or whatever course of preparation has been adopted. The quantity of seed generally varies from 2 to 3 bushels; and of Matagans or other large varieties, even 4 bushels.

When beans are sown upon ridges, like turnips, of course it is always intended to practise summer horse-hoeing, and so obtain the benefit of a partial fallow or cleansing green crop, while reaping a more valuable produce of corn. But the same advantageous culture may be followed when beans are sown on the flat by a common drill, the distances between the rows being so arranged as to have, say, 2-feet intervals for horse-hoeing between double rows 6 inches apart. Since the days of Jethro Tull, so great have been the advantages found to result from horse-hoeing during the growth of crops, that it is surprising to find a practice indispensable to the obtaining of a full crop of roots or potatoes so extensively neglected with regard to grain crops. We know that horse-hoed beans do not always yield a greater produce than those sown in narrower rows and merely hand-hoed; but *taking into consideration the whole circumstances in which the crops are grown*, we maintain that the advantage is greatly in favour of the wide-drilled and horse-hoed. When the rotation brings in beans quickly after a fallow, and fallows in pretty quick succession, the beans being taken as one among the corn crops which help to render necessary a cleansing fallow, it may certainly be advisable to drill in equidistant rows not far apart; though even then, such is the love of the bean-plant for room to breathe and flower in strength and health, that any overcrowding will be sure to punish the farmer for his mismanagement, and any undue thickness in seeding ought to be counteracted by a careful thinning with the hoe. But the merit of the horse-hoeing system is that the crop is made to clean instead of foul the land, and that, while it cannot be altogether substituted for a fallow crop—which allows a sufficient time in spring for eradicating couch—still, if only a moderate stock of perennial root-weeds is present, they may be kept from spreading in the soil, the land is both partially cleansed and fertilized, and additional paying crops may prolong the course before the necessity again returns for the expensive labour of fallowing. We submit then, to some of our readers, how far they can substitute beans for green crops on the least foul portion of their land now lying ploughed for spring fallow; how far they dare venture in getting a good corn crop during these times of high prices, now that the new broadsharing and stubble-cleaning implements afford such ready facilities for the autumn preparation of the bean-land for wheat.

As has been shown in our articles on tillage, modern improvements are proceeding more and more upon the principle of doing as little as possible by mechanical labour, which Nature herself will effect for us; and we are beginning to learn that Nature can perform our work in many cases better than we can ourselves. Thus, in preparing land for beans, it is becoming more usual to plough before the winter-frosts set in, instead of very little before the time for sowing; and then to avoid spring-ploughing, and again burying the very surface which the weather has pulverized and impregnated ready for our use. The heavy-land farmers of Suffolk have discovered the advantage of thus sowing on a stale winter-furrow: they simply scarify in spring, just to let in the shares of the drill. In Nottinghamshire, the best growers on the clays prepare the ridges in November; and in spring, when the land is dry enough, they open a small furrow in the frosted mould of the hollow between each ridge, a drill-barrow following and depositing the seed. The ridges are then reduced by harrowing. By this winter exposure and spring surface-working the land is left remarkably light, and in fine order for hoeing throughout the summer. We would, therefore, urge bean-sowers who may be just arranging their teams for ploughing and working their winter-ploughed land for this crop to reflect whether they cannot judiciously spare all this puddling with many horses, which will only render the ground harder when dry weather comes; and rather scarify or harrow sufficient mould to cover the seed, leaving subsequent cultivation to reduce the soil and kill weeds at the same time.

ONIONS seem to be a preventive and remedy for various diseases to which domestic poultry is liable. Having frequently tested their excellencies, we can speak understandingly. For gapes and inflammation of the throat, eyes, and head, onions are almost a specific. We would recommend feeding fowls, and especially the young chicks, as many as they will eat as often as twice or three times a week. They should be finely chopped, and a little corn meal added.

GROSS RECEIPTS OF CUSTOMS' DUTIES ON SOME OF THE PRINCIPAL ARTICLES OF AGRICULTURAL PRODUCE, &c.

The Government Returns of the Gross amount of Customs' Duties received upon some of the principal articles of Foreign and Colonial Agricultural Produce and Merchandise, in the year ended 5th January, 1855, compared with the receipts in the two preceding years.

Articles.	1853.	1854.	1855.
Butter	£ 148574	£ 131755	£ 119708
Cheese	70408	59663	48890
Cocoa	15376	17741	19015
Coffee:—From British Posses	346622	351892	386509
„ other parts	91454	111774	81884
Total of Coffee	438076	463666	468393
Corn:—Wheat	153712	247569	173440
Barley	31338	41435	28041
Oats	49775	51755	51467
Rye	501	3835	295
Peas	5356	5090	5554
Beans	18767	17526	19408
India Corn or Maize	74010	77647	67920
Buckwheat	404	356	14
Bere or Bigg	—	48	30
Wheatmeal or Flour	72932	87123	68997
Barley Meal	4	1	1
Oat Meal	10	15	9
Rye Meal	2	—	58
Indian Corn Meal	14	292	1049
Buckwheat Meal	1	1	1
Cotton manufactures, wholly or in part made up	1149	1789	2172
Eggs	39507	28896	18004
Fruits, viz.:—Currants	285933	146707	134853
Figs	26478	26972	30660
Lemons and Oranges	36058	53411	27423
Raisins	180535	140078	119017
Hams	1133	486	—
Metals, viz.:			
Copper Ore and Regulus	2177	917	—
Copper, unwrought, and part wrought	588	170	—
Lead, pig and sheet	1642	517	—
Tin, in blocks, ingots, bars, or slabs	9631	3525	—
Opium	3282	3455	3072
Poultry, alive or dead	1793	356	—
Rice	16000	17725	15878
„ in the husk	1464	725	806
Seeds, Clover	25160	35855	15
Spirits, viz.:—Rum	1106893	1253259	1276608
Brandy	1443422	1402933	1396970
Geneva	19737	20995	19325
Sugar, unrefined	3689958	3918729	4538110
Sugar, refined, and Candy, of or from British Possessions	3465	7320	7299
Ditto, ditto, Foreign	267407	183287	244094
Ditto Molasses	160694	172816	197529
Tallow	78432	89744	52115
Tea	5985484	5686193	4781901
Timber and Wood, sawn or split:			
Of British Possessions	60266	65450	78316
Foreign	274529	284614	290155
Staves	79	129	267
Timber or Wood, not sawn or split:—Of British Posses.	30512	31271	36438
Foreign	148891	183342	216627
Tobacco:—Stemmed	2959083	2904194	2682330
Unstemmed	1507460	1748884	2095772
Manufactured, and Snuff	94209	102199	97868
Wine	1872942	2036075	2022527
Woollen Manufactures wholly or in part made up	6950	5870	2893

A. W. Fonblanque.

Statistical Department, Board of Trade, 1855.

THE HOP AND ITS SUBSTITUTES.

From "The Chemistry of Common Life," by James F. W. Johnston, M.A.

The hop—which may now be called the English narcotic—was introduced into this country at a comparatively recent period. It may have been employed in Germany in the times of the Roman writers, but was probably unknown to them. Its use, as an addition to malt liquor, appears to be of German origin. Hop gardens, by the name of Humolariæ, are spoken of in documents of. the early part of the ninth century, and frequently in those of the thirteenth century. Into the breweries of the Netherlands the hop seems to have been introduced about the beginning of the fourteenth century. From the Low Countries, or, as some say, from Artois, which borders upon them, it was brought to England in the reign of Henry VIII., some time after his expedition against Tournay, and about the year 1524. In the twenty-second year of his reign (1530), that monarch, in an order respecting the servants of his household, forbad sulphur (1) and hops to be used by the brewers. Three quarters of a century later (1603), the introduction of spoilt and adulterated hops was forbidden by James I. under severe penalties. This appears to show that, though considerable attention is known to have been already given to the cultivation of the hop in England, a large part of the hops supplied to the home market was still brought from abroad.

(1) This probably refers to the practice, which still prevails, of whitening or bleaching hops with fumes of sulphur, and which may not then have been so skilfully conducted as it is now.

1.—CONSUMPTION OF THE HOP.

At present the hops consumed in the United Kingdom are almost entirely of home growth, and the consumption is very great. For the last four years the quantities retained for home consumption, and the amount of duty * paid into the revenue, amounted to—

Years.	Consumption.	Duty.
1850	84,267,158 lb.	£232,576
1851	26,138,906	129,580
1852	50,146,639	244,866
1853	30,949,590	152,677
Average..	38,375,573 lb.	£189,425

This average is supposed to represent as large a quantity of hops as is grown in all the world besides. How different a taste does this large consumption argue now from what must have prevailed in the beginning of the seventeenth century, when the city of London petitioned Parliament against two nuisances—against Newcastle coals in regard of their stench, and against hops in regard they would spoil the taste of drink, and endanger the people! * The produce of Belgium, which, for its population of 4½ millions, is one of the largest hopgrowers in Europe, amounted in 1853 to 7,653,206 lbs.

In Germany, Rhenish Bavaria, and the Grand-duchy of Baden grow much hops, and of excellent quality; but the amount of yearly produce I have no means of ascertaining. Holland grows little, and supplies itself in part by importations from the United States of North America.

In Russia, a variety of the hop grows wild in the Taurida, the Ural, and the Altai; but the principal supply is said to be imported from abroad.

The reason why the quantities retained for home consumption vary so much in the years above given, is that the crop is a very variable one, and that the crop of plenteous years is reserved to meet the demand of the less fruitful. An average consumption of about forty millions of pounds is very large; but the importance of this plant among the narcotics in which we indulge appears more clearly, when we compare the average consumption of it with that of tobacco. These are as follows:—

Hops, average consumption ..	38,375,573 lb.
Tobacco in 1853............	29,737,561
	8,638,012 lb.

The yearly consumption of the hop exceeds, by two-sevenths of the whole, the home consumption of tobacco. It is the narcotic substance, therefore, of which England not only grows more, and consumes more, than all the world besides, but of which Englishmen consume more than they do of any substance of the same class.

And who, that has visited the hop-grounds of Kent and Surrey in the flowering season, will ever forget the beauty and grace of this charming plant? Climbing the tall poles, and circling them with its clasping tendrils, it hides the formality and stiffness of the tree that supports it among the exuberant profusion of its clustering flowers. Waving and drooping in easy motion with every tiny breath that stirs them, and hanging in curved wreaths from pole to pole, the hop-bines dance and glitter

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* The duty is 18s. 8d. the cwt., and five per cent. additional.

* See Walter Blith's "English Improver Improved," 3rd edition, 1653.

beneath the bright English sun—the picture of a true English vineyard, which neither the Rhine nor the Rhone can equal, and only Italy, where her vines climb the freest, can surpass.

2.—CULTIVATION OF THE HOP.

The hop "joyeth in a fat and fruitful ground," as old Gerald wrote in 1596; "it prospereth the better by manuring." And few spots surpass, either in natural fertility or in artificial richness, the hop lands of Surrey, which lie along the outcrop of what are called the green-sand measures in the neighbourhood of Farnham. Naturally rich to an extraordinary degree in the mineral food of plants, the soils in this locality have been famed for upwards of two centuries for the growth of hops; and, with a view to this culture alone, at the present day, the best portions sell as high as £500 an acre. And the highest Scotch farmer—the most liberal of manure—will find himself outdone by the hopgrowers of Kent and Surrey. An average expenditure of ten pounds sterling an acre for manure over a hundred acres of hops, farmed by a single individual, makes this branch of farming the most liberal, the most remarkable, and the most expensive of any in England.

This mode of managing the hop, and the peculiar value and rarity of hop land, were known very early. They form parts of its history which were probably imported with the plant itself. Tusser, who lived in Henry VIII.'s time, and in the reigns of his three children, in his *Points of Husbandry*, thus speaks of the hop—

"Choose soil for the hop of the rottenest mould,
Well-doonged and wrought as a garden-plot should:
Not far from the water (but not overfloune),
This lesson, well noted, is meet to be knowne.

The sun in the south, or else southlie and west,
Is joy to the hop as welcommed ghest;
But wind in the north, or else northerly east,
To hop is as ill as fray in a feast.

Meet plot for a hop-yard once found, as is told,
Make thereof account as of jewel of gold;
Now dig it, and leave it the sun for to burne,
And afterwards fense it, to serve for that turne.

The hop for his profit I thus do exalt:
It stengtheneth drink, and favoureth malt;
And being well brewed, long kep it will last,
And drawing abide, if ye draw not too fast."*

3.—USES OF THE HOP.

The hops of commerce consist of the female flowers and seeds of the *Humulus lupulus*, or common hop plant. Their principal consumption is in the manufacture of beer, and they possess three properties which particularly fit them for this use. First, they impart to malt liquors a pleasant, bitter, aromatic flavour, and tonic properties. Second, they give them a peculiar *headiness*, often confounded with alcoholic strength, and thus save to the brewer a certain proportion of his malt. The soporific quality of beer, also, is ascribed in part to the narcotic quality of the hop. Third, by their chemical influence they clarify malt liquors, and check their tendency to become sour. They arrest the fermentation at the alcoholic stage; and it appears, from the history of the art of brewing, that beer which could be kept for a length of time has only been manufactured in England since the hop has been introduced. "The ale," says Parkinson (1640), "which our forefathers were accustomed only to drink, being a kind of thicker drink than beere, is now almost quite left off to be made, the use of hoppes to be put therein altering the quality thereof, to be much more healthful or rather physicall, to preserve the body from the repletion of grosse humours which the ale engendereth."

4.—VARIETIES OF THE HOP.

Of the cultivated hop there are many varieties; but in our principal English hop districts, Kent, Surrey, and Sussex, only about five varieties are extensively grown. These are—

First.—The *goldings*, grown chiefly in middle and east Kent. They delight in a rocky calcareous soil, or a rich friable loam. They thrive only in the most naturally fertile kinds of soil.

Second.—The *white-bines* are the favourites of Farnham and Canterbury. They require the same description of soil as the goldings, are very similar in their appearance and growth, and have nearly the same value in the market. The flower of the white bines is considered to possess the most delicate flavour, while that of the goldings is thought by some brewers to have more strength.

These two varieties are most esteemed for the brewing pale bitter ale. They both require very long poles, and, on the average of years, produce smaller crops than the coarser kind of hop.

Third.—The *Jones's* stand next in favour with the brewer. They will grow on inferior land; and as they require very short poles, and are pretty good croppers, they are in general favour with growers in Kent.

Fourth.—The *grape* has many sub-varieties, and requires longer poles than the Jones's. This variety delights in stiff, heavy soils, after thorough drainage, and produces very heavy crops. Hence its prevalence in the Weald. It is commonly used for the ordinary sorts of beer.

Fifth.—The *colegate* is a smaller variety of hop than the grape, but produces enormous crops in

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* "Five Hundred Points of Good Husbandry." London edition of 1812, p. 167.

Sussex and the Weald of Kent. It is often surreptitiously passed off in the market as goldings; but it is greatly disliked by the brewers, on account of the rankness of its flavour. It is looked on by many as the worst hop that is grown.

From the kind of soil on which they grow, these two varieties are also known by the name of *clay hops*. Those which are raised in the Weald of Kent and Sussex, should, I suppose, be called *south clay hops*, as those which grow on stiff clays of Nottinghamshire are known in the market as the *north clays*.

From this brief description of the more common varieties of this plant, it will be understood that a great diversity of flavour and quality must prevail among the hops, not only of different districts, but even of the same county. Thus the county of Kent produces hops of various degrees of excellence, the best samples combining in an eminent degree the qualities of flavour and strength. The soils of this county rest chiefly on the chalk, but partly, also, on its south-west border, on the green-sand formation. Its northern part is covered by the tertiary beds of the London basin; and it is around Rochester and Canterbury, where the clays of these tertiaries and the porous chalks meet, that the best Kent hops are grown. Inferior samples grow on the clays of the Kentish Weald.

In Surrey, again, the hops of the neighbourhood of Farnham have from time immemorial borne the highest price of the British hop market. They grow on the marly soils rich in phosphate of lime, which are formed from the rocks of the green-sand formation; and so much does their excellence depend upon the natural quality of the soil, that the value of the crop changes sometimes on the mere crossing of a hedge. The change of quality in the soil in this locality is often sharp and sudden, and hence the equally sudden change in the quality of the crops it produces.

The clay hops of Kent and Sussex are coarse and rank, but those of the small district of Retford, in Nottinghamshire, called the *north clays*, are pre-eminent in rankness. They give a coarse flavour to beer, which is almost nauseous to those who are unaccustomed to it. The stiff clays of the county of Nottingham, on which these hops grow, lie in the valley of the Trent, and are formed chiefly from the debris of the new red sandstone, through which the Trent flows, with admixtures from the coal measures, magnesian limestone, and lias clay brought down by the feeders of the Trent. Probably a more thorough drainage of this district would improve the quality of its hops.

To those who are accustomed to the mild flavour of the Kent hops, that of the north clays is almost nauseous. But the Kent hops, again, are relished by those who have been accustomed to the still milder flavour of the Worcester hops. These excel in this respect the best Kent goldings, and are usually very taking to the eye. In practice, they are found to ripen beer sooner than any other variety of hop. They grow on the red soils of the vale of Severn, and, in the opinion of beer drinkers, possess a grateful mildness not to be found in any other hops. Hence, in Lancashire, Cheshire, and some other counties, where the taste for the Worcester hops exists, even fine Kent hops would be rejected as unsaleable. A nice Lancashire beer drinker calls beer hopped with Kent hops *porter ale*. They do not answer, however, for the best descriptions of malt liquor, such as the pale ale, because they do not impart so fully the keeping quality.

The red soils of Worcestershire are formed from the debris of the new red sandstone, sifted and sorted by the waters of the Severn. The traveller passes through part of this hop region on his way from Worcester to Malvern. The red soils of Hereford, on which hops also are largely grown, are derived from the old red sandstone, and in mildness of quality the hops they yield are, I believe, similar to those of Worcester. Rich, open, and friable, these red soils so far resemble those of Kent and Surrey, from which the Canterbury and Farnham hops are gathered. The variety of hop grown in this region differs, however, from those of Kent and Surrey. It is supposed to be a descendent of the Flemish red bine.*

Thus the soil or locality in which they are grown, and the variety raised, have much influence upon the flavour which the hops will impart to beer. But besides these, the time of picking, the mode of drying and curing, the care bestowed on the bagging, the place in which they are afterwards kept, and the length of time they have been gathered, all affect the finer qualities of the hop flower. And if to these we add the numerous minute variations which occur in the process of brewing, from time to time, even in the same

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* The proportions in which these several kinds of hops are grown and used in England, may be judged of by the amount of duty paid by those of each locality in 1852 and 1853.

	1852.		1853.
Rochester	£97,174	..	£61,085
Canterbury	52,746	..	33,628
Kent	149,920	..	94,713
Sussex	63,654	..	38,668
Worcester	12,625	..	11,283
Farnham	16,311	..	6,909
North Clays	942	..	225
Essex	1,200	..	807
Sundries	210	..	69
	£244,862		£152,674

establishment, it will no longer appear surprising that a very great variety of flavours should be given to beer by the use of hops alone.

5.—ACTIVE INGREDIENTS OF THE HOP.

In so far as such diversities of flavour depend upon the quality of the hop itself—and not upon the quality of the water employed, which much affects the flavour of the beer—they are probably due, as in the case of tobacco, to the different proportions in which the active chemical ingredients of the flower exist in the several samples. These active ingredients, in so far as is yet known, are three in number—a volatile oil, a slightly aromatic resin, and a bitter principle.

a. The volatile oil.—When hop flowers are distilled with water, they yield as much as 8 per cent. of their weight of a volatile oil. This oil has a brownish-yellow colour, a strong smell of hops, and a slightly bitter taste. In this oil of hops it was supposed that a portion of the narcotic influence of the flower resided. Recent experiments render this opinion doubtful. The raw oil is a mixture of two volatile oils, and sometimes exhibits narcotic properties. When rectified, these properties disappear. It seems probable, therefore, that in the case both of tobacco and of the hop, a minute but variable proportion of volatile narcotic substance distils over along with the oil, and that to this other substance the oil owes the narcotic qualities it sometimes exhibits. The nature of this volatile narcotic body has not been examined.

The hop has long been celebrated for its sleep-giving qualities. To the weary and wakeful the hop pillow has often given refreshing rest, when every other sleep-producer has failed. It is to the escape of the volatile narcotic ingredient above mentioned, in minute quantity from the flowers, that this soporific effect of the hop is most probably to be ascribed.

Upon the same volatile ingredient depends the odour which is perceived in storerooms where hops are kept, and much of the aroma they impart to beer. It is owing to the escape of this ingredient, even from the most closely-pressed hops, that they deteriorate in quality so much by keeping, as usually to fall one-third in value when upwards of one year old. By boiling in the wort, also, a portion of the same delicate aromatic principle is driven off and lost to the beer.

b. The aromatic resin.—When dry hop-flowers are beat, rubbed, and sifted, a fine yellow dust separates from them, which is equal in weight to about a sixth part of that of the hops. The fine powder is sometimes distinguished by the name of *lupulin*. Hop buyers talk of it as the "condition" of the hop. Under the microscope the powder is seen to consist of minute, somewhat transparent, grains or glands of a rounded form, a golden-yellow colour, and a cellular texture. By drying, they lose their round form, and when put into water they give out an immense number of minute globules. The function of these organised lupulinic glands, as a part of the plant, is involved in much obscurity. They possess a strong, agreeable odour, and a bitter taste. When taken internally they are aromatic and tonic. They soothe, also, and tranquillise, allay pain, reduce the pulse, and in a slight degree provoke sleep. Alcohol extracts from them, and dissolves out more than half their weight of a reddish-yellow, transparent resin, which is slightly aromatic, but when pure is not at all bitter. This is the aromatic resin of the hop flower, of which it forms one-twelfth part, or eight per cent. by weight. What share this resin has in producing the effects which follow from swallowing the entire grains, is not satisfactorily known.

c. The bitter principle.—Besides the resin, the little grains contain two per cent. of a volatile oil, two per cent. of tannin, and ten per cent. of a peculiar bitter principle. This last is the best-known constituent of the hop, and gives bitterness to our beers. In the other parts of the flower, also, there exists a bitter ingredient, upon which few accurate experiments have been made. The bitter matter of the grains is said not to be narcotic, but what is its true action on the system is not known. The tannin helps to clarify the beer.

But though the specific action of each of the chemical principles contained in the hop flower has not been very well ascertained, the united action of all of them together is well known. The tinctures and extracts of hops, which we use in medicine, and introduce into our beers, contain them all; so that all the virtues of the hop, in whichever of the ingredients it resides, are present in them in a greater or less degree. Hence, well-hopped beer is aromatic, tonic, soothing, tranquillising, and in a slight degree narcotic, sedative, and provocative of sleep. The hop also aids in clarifying malt liquors, arrests the fermentation before all the sugar is converted into alcohol, and thus enables them to keep without turning sour.

Ale was the name given to unhopped malt liquor before the use of hops was introduced. This is alluded to in the passage already quoted from Parkinson, and in the two old lines—

> "*Hops*, reformation, bays and *beer*
> Came into England all in one year."

The words of Gerald, also, show the original meaning of the two words. "The manifold virtues in hops do manifestly argue the wholesomeness of beer above ale; for the hops rather make it physicall drinke, to keep the body in health, than an ordinary drink for the quenching of our thirst." When hops were added, it was called beer by way of distinction; I suppose, because we imported the custom from the Low Countries, where the word beer was still in use.* Ground ivy (*Nepeta glechoma*), called also *alehoof* and *tunhoof*, was generally employed for preserving ale before the use of hops was known.

To the general reader it may appear remarkable—perhaps he may even think it a reproach to science—that the chemistry of a vegetable production in such extensive use as the hop should still be so imperfect, our knowledge of its nature and composition, and of the special physiological effects of its several constituents, so unsatisfactory. But the well-read chemist, who knows how wide the field of chemical research has become, how rapidly our knowledge of it as a whole is progressing, and who endeavours in his daily studies to keep up with that progress—he will feel no surprise. He must wish, indeed, to see all such obscurities and difficulties cleared away; but he will feel more inclined to thank and praise the many ardent and devoted men who in every country are now labouring in this department, and to encourage them in what they are doing, than to blame or reproach them for being obliged to leave a part of the extensive field for the present uncultivated.

The hop, as we have seen, is to be placed among the most largely-used narcotics, especially in England. It differs, however, from tobacco and the other favourite narcotics to be hereafter mentioned, in being rarely employed alone except medicinally. It is added to infusions like that of malt, to impart flavour, taste, and narcotic virtues. Used in this way it is unquestionably one of the sources of that pleasing excitement, gentle narcotic intoxication, and healthy tonic action which well-hopped beer is known to produce upon those whose constitutions enable them to drink it. Other common vegetable productions will give the bitter flavour to the malt liquors. Horehound, wormwood, gentian, quassia, camomile, fern leaves of different species, broom tops, ground ivy, common gale, the bark of the box tree, dandelion, chicory, orange-peel, picric acid, chirayta, the poisonous strychna,* and many other substances, have been employed or recommended in England, to replace or supplant the use of the hop. But none of these are known to approach it in imparting those peculiar properties which have given the English bitter beer of the present day its high reputation.

It is interesting to observe how men carry with them their early tastes to whatever new climate or region they go. The love of beer and hops has been planted by Englishmen in America. It has accompanied them to their new empires in Australia, New Zealand, and the Cape. In the hot East their home taste remains unquenched, and the pale ale of England follows them to the remotest Inde. Who can tell to what extent the use of the hop may become naturalised, through their means, in these far-off regions? Inoculated into its milder influence, may not the devotees of opium, and intoxicating hemp, be induced hereafter to abandon their hereditary drugs, and to substitute the foreign hop in their place? From such a change in one article of general consumption how great a change in the character and habits of the people might we not anticipate?

III.—COCCULUS INDICUS

Can scarcely be classed among the narcotics in which we voluntarily indulge, and yet it is one which our humbler beer-drinkers involuntarily consume to a very considerable extent. It is a fruit or berry of the *Anamirta cocculus*, a beautiful climbing plant, which is a native of the Malabar coast and of the Archipelago. It is sometimes called the Levant nut, on the *Bacca orientalis*. It has some resemblance to the bay berry, and in 1850 was imported into this country to the extent of 2359 bags, of one hundredweight each. It is chiefly used for adulterating cheap beer, and it is really wonderful in how many ways this singular substance is fitted to aid the dishonest brewer in saving both malt and hops. I mention three of its properties which offer temptation too strong to be resisted by many unscrupulous people.

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* This word is found both in the new and old dialects of the high and low Germans, Dutch, and Flemish, in the form of *bier*. In France it is *bière*, and in Italy *birra*. In these latter countries it has superseded the old word *cervoise*, still used in Languedoc; *cervogia*, still heard in Italy—both of which, like the Spanish *cerveza*, are from the Latin *cerevisia*, a word used by Pliny for a drink made from malt.

In Anglo-Saxon, it was *beor*; in new and old Norsk, *bior*; in Gaelic, *beôir*; in Breton, *ber* or *bier*; and the Britons are said by Tacitus to have made a sort of wine from barley, which they called *baer*.

But this word for the drink disappeared from England, and ale took its place, till it was brought in again to denote *hopped* ale, a sense which it did not originally bear. It disappeared also from the Welsh, whose name for beer is *cwrw*. But though it has penetrated into France and Italy, *öl* is still the only word in use in Scandinavia. This Scandinavian name, which prevailed among us after the Romans left, points, like so many other relics, to the race which has chiefly predominated in the island since.

* Strychnia is an intensely bitter substance contained in nux vomica; chirayta, an intensely bitter plant from India; and picric acid, an almost equally bitter substance produced by the action of nitric acid upon indigo. The latter two have only recently been tried for giving bitterness to beer. The first is too poisonous for any but very reckless people ever to recommend. It is so bitter that its taste can be detected when dissolved in 600,000 times its weight in water.

If the bruised seeds are digested in water, they yield an extract which, when added to beer, produces the following effects:—

First.—It imparts to it an intensely bitter taste, and can thus be substituted cheaply for about one-third of the usual quantity of hops without materially affecting the flavour of the beer.

Second.—It gives a fulness and richness in the mouth, and a darkness of colour, to weak and inferior liquors. In these respects, a pound of *Cocculus indicus* is said to be equivalent to a sack (four bushels) of malt. Or, to a thin brewing of beer, a pound of this drug will give an apparent substance equal to what would be produced by an additional sack of malt.

Third.—It produces upon those who drink it some of the symptoms of alcoholic intoxication, and thus adds to the apparent strength and inebriating quality of the liquor. Like hops, it also prevents second fermentation in bottled beer, and enables it to keep in warm climates.

This array of tempting qualities causes it to be used largely by some brewers, chiefly of the disreputable class, who seek to gratify, at a cheap rate,* certain wishes and desires of their customers. The use of it is forbidden, by the Act of Parliament, under a penalty of £200 to the brewer, and of £500 to the druggist who sells it to a brewer. But an extract is prepared and sold, and there is reason to believe that it is extensively used —(*Pereira*). Some writers on brewing give plain directions for using the drug; and the quantity recommended by Morrice to the honest brewer (!) is three pounds of *Cocculus indicus* to every ten quarters of malt. By the dishonest, as much as one pound is sometimes added to the barrel of 54 gallons, with *Calamus aromaticus* and orris root to flavour it. If one pound really save four bushels of malt, the 2359 cwt. imported in 1850, if all employed for this purpose, must have saved to the adulterators who used it the enormous quantity of 1,056,000 bushels!

It is chiefly the humbler classes upon whom this fraud is practised. The middle classes in England prefer the thin wine-like ales and bitter beers. The skilled labourer prefers what is rich, full, and substantial in the mouth; and the poor peasant, after his day's toil, likes to find at the bottom of his single pot what will sensibly affect his head. It is thus chiefly among the working men that the heavy-drugged beer of the adulterator is relished and consumed; and it is probable that something of the peculiarly beastly forms of intoxication sometimes seen among these classes is to be ascribed to the influence of *Cocculus indicus*.

The effects which this substance produces are said, by those who have drunk beer drugged with it, to be more upon "the voluntary muscles than upon the intellectual powers."* If so, a man under its influence may be surprised by finding his body helpless, while his mind is comparatively clear, and still capable of reasoning and judging with tolerable correctness. Others say, however, that its effect is chiefly on the brain, so that its mode of action probably varies in some degree with the constitution of the person who takes it.

In large doses it is poisonous to all animals, and a well-known use of it is for the stupefying of fish.† Although, therefore, its special effects upon the human constitution have not been accurately ascertained by scientific physiologists, the frequent use of *Cocculus indicus,* even in small doses, can scarcely fail sooner or later to injure the health.

This poisonous quality is derived chiefly from a white crystalline intensely bitter substance called *picrotoxin,* which exists in the inner portion of the berry. The way in which this poisonous ingredient acts upon the system is still involved in considerable obscurity; but there cannot be a doubt as to the moral criminality of introducing substances of so dangerous a kind into the common drink of the least protected part of the people.

IV.—OTHER SUBSTITUTES FOR THE HOP.

Other narcotic substances more or less powerful are in different countries substituted occasionally for the hop. And, like Cocculus indicus, the most injurious of these substitutes are generally introduced into the liquor without the knowledge of the drinker. Thus—

1.—IN SOUTH AMERICA the bitter stalks of the *Schinus molle* are mixed with the chica, which is prepared by stewing the sweet pods of the *Prosopis algaroba.*‡ What is the action of this bitter substance on the drinker of the chica is not stated.

2.—IN INDIA, when the raw cane sugar (jaggery) is fermented with a view to the distillation of rum, chips of the dried bark of the *Acacia ferruginea* or *A. leucophlea* are added to the liquor. It is supposed to act like hops in moderating the fermentation, and probably gives a flavour and other peculiar qualities to the rum distilled from it, but it is not known to be added with a view of any narcotic effects. The rum itself is described by Buchanan as being execrable.[*]

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* It is sold at 19s. to 21s. a cwt., or 2½d. a pound.

* Pereira, "Materia Medica," 3rd edition, page 2155.

† In India, the bruised leaves of *Phyllanthus conami*, and the capsules of the *Xanthophyllum hastile* (Lindley), and on the Himalayas the seeds of the Chaubmoogra, and the fruit of the evergreen Took, or Hydrocarpus, are used for intoxicating fish—(Hooker). The bruised root of the *Randia dumetorum* has a similar effect—(Roxburgh). I am not aware that any of these are ever administered to man. The Indians of South America use bruised Angostura bark to intoxicate fishes —(Hancock); and the Peruvians make the same use of Cinchona bark—(Saunders).

‡ See "The Liquors we Ferment," p. 304.

3.—IN CHINA, a kind of beer, called *tar-asun*, is made from barley or wheat. In brewing this beer, a prepared hop is added to the wort, which both causes fermentation and performs, at the same time, the duties of the hop. Of what this preparation consists my authority does not say.[†]

4.—IN AFRICA.—In preparing their hydromel, or mead, the Abyssinians add to the solution of honey a portion of a bark called *keeto*. The leaves and fruit of the tree from which this bark is taken are narcotic and poisonous. It is probable, therefore, that the bark, which is described as bitter, a stringent, and tonic, may also possess a portion of the same narcotic virtue, and impart it to the mead.

The leaves of a tree called *kessho* are likewise used in Abyssinia for mixing with mead [‡], but it is not stated if they possess narcotic properties. Other travellers speak of a root called *taddo* as being in common use among Ethiopian tribes, as an addition to the mixture of malted barley and honey of which their favourite drink is made. But nothing is known of the chemical history of these and other substances.

5. — IN NORTHERN EUROPE. — The *Ledum palustre* (the marsh ledum, or wild rosemary), a heath plant, common in the north of Europe, was formerly used in Sweden and North Germany for giving bitterness and apparent strength to malt liquors. Its leaves when infused in the wort render the beer unusually *heady*, so as to produce headaches, nausea, and even delirium, when drunk to excess. In Germany the use of it for this purpose is now forbidden by law. Like Cocculus indicus among ourselves, however, it is said [§] to be still used extensively by fraudulent brewers in the northern part of that country, to give a dangerous intoxicating power to their beer. When, and how, shall the poor and ignorant find shelter from knowing fraud?

The *Ledum latifolium* possesses similar narcotic properties, and, where it occurs in sufficient abundance, is used instead of, or along with, the *palustre*.

In North America, both these plants are known by the name of Labrador tea, and are used as substitutes for Chinese tea. Both are very astringent; and, in addition to the tannic acid to which this property is due, probably contain also a narcotic principle not yet examined. To this narcotic principle both the qualities which fit these plants to be used in cold climates as a substitute for tea, and those which enable it to impart intoxicating properties to beer, are to be ascribed. According to Dr. Richardson, the narrow-leaved *L. palustre* is better suited of the two for the making of tea [*]. Both plants would probably well repay a detailed chemical examination.

The leaves of yarrow or millefoil (*Achillea millifolia*) have the property of producing intoxication. These are also used in the north of Sweden by the Dalecarlians to give headiness to their beer.

6.—IN ENGLAND clary (*Salvia solarea*) is said to give an intoxicating quality to beer. Saffron also, the dried stigmas of the *Crocus sativus*, has a similar effect. It exercises a specific influence on the brain and nerves, and when taken in large doses, causes immoderate mirth and involuntary laughter. Its exhilarating qualities are so remarkable that it has been supposed to be the *nepenthes* of Homer; and to denote a merry temper it became a proverb, "Dormivit in sacco croci"—(he has slept in a saffron bag). It has the singular property, also, of counteracting the intoxication produced by alcoholic liquors, as hops to some extent do. This was known to Pliny, who says that it allays the fumes of wine and prevents drunkenness. "It was therefore taken in drink by great wine-bibbers, to enable them to drink largely without intoxication [†]." Its effects, however, are very uncertain, and it is now little used in medicine, and still less, I believe, for adulterating beer.

PRACTICE *v.* CHEMISTRY.

Agricultural chemists insist upon the propriety of preserving the ammoniacal salts contained in farm-yard manure, by protecting it with a layer of earth, ashes, and mud scrapings, from the drying wind and hot sunshine; but what satisfactory reasons can they give for following startling facts? Manure has been carried from the yard to the fields, that has been drilled up for beans in the middle of winter, and laid in small heaps, or spread along the drills, and lay there for months exposed to every change of weather, washed by the winter's rain and snow, bleached by the frost, and dried by the strong winds; yet excellent crops have been produced in this way, and under a high altitude of climate; and the crops have been superior on the best soils, and under the best climate. This is no dare-devil assertion, but a constant success of many years; and however it may clash with the doctrines of chemistry, it may be added that facts are stubborn things.

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[*] "Journey Through the Mysore," vol. i., p. 39.

[†] Morewood "On Inebriating Liquors," p. 120.

[‡] Harris's "Highlands of Ethiopia."

[§] Beckwith's "History of Inventions" (Bohn's edition), vol. ii., p. 885.

[*] See "The Beverages we Infuse," p. 194.

[†] For much more on saffron, see Phillips' "History of Cultivated Vegetables," vol. ii., p. 180.

Practice constantly shows that exposure does not in any way injure rotted farm-yard dung that is applied for turnips in June, which is the hottest time of the year.

East Lothian, 1855.

THE CULTIVATION OF ITALIAN RYE-GRASS.

The cultivation of Italian rye-grass is just one of those points which farmers generally would wish to be better informed upon. They have already heard so much about it, and yet so little to be depended on, that they cannot but welcome any more definite and satisfactory information upon the subject. The London Club, then, has done well in taking up the matter. An open discussion would promise to clear away many of those mysteries we have lately associated with the production of this plant, as to assure the practical man how far it was really worthy of his attention.

It must not be assumed that the growth of Italian rye-grass has been so far unknown to the English farmer. It will be seen that in a not very full meeting on Monday night there were some half-a-dozen members ready to speak to their experience of it on this side of the Border. The simple fact is, that its value must be taken from two different points of view. Italian rye-grass, treated such as other grasses are, produces very good crops: so said Mr. Baker, Mr. Bradshaw, Mr. Shearer, and Mr. Williams, who had all tried it. We cannot, however, stop here. Not content with regarding it as very good, we must receive it as something very wonderful. By extra care and outlay, we may arrive at very extraordinary results. This is the point. The agriculturist, for the future, must not be satisfied with one or two crops in a season. He must go in for something far beyond this, and here he naturally hesitates to enquire with what certainty it will be to his interest to do so.

It will be observed that the gentleman who undertook to introduce the subject confined himself almost entirely to the realization of these grand results. It will be found, too, that he had been at great pains in personally inspecting those farms where Italian rye-grass had been rendered so prolific, and that he returned from the North armed with a mass of statistical information on the system. It is not always that an elaboration of figures can be taken as the best plan for pointing an argument. In a *vivâ voce* discussion especially they are difficult to follow, and but seldom provocative of much advantage in debate. We are very willing to allow, however, that facts and figures have been much wanted here, and that much could not have been accomplished without them. Previous to undertaking on himself this extra expense, the prudent man will naturally ask what it will cost; or, in other words, that he will look to means before he ventures to arrive at results. The improved method of cultivating Italian rye-grass is essentially an expensive one; on this the whole success of the thing depends. It is not, then, too much to ask for some idea as to what may be this increased outlay.

And here we confess it strikes us is the weak place in the address. The great results achieved in the North with this plant have been accomplished, we are told, mainly, by continual irrigation, and that this irrigation is applied by underground pipes and tanks. The first question naturally is, what will these cost? What capital will it require to lay out a system of machinery in this way? The question is still to be asked. The speaker here declines to enter into it, but he suggests that each man should go north, and there put the inquiry in person. We can scarcely think this is the best inducement for him to do so. Surely a tolerably good notion might have been afforded us as to what underground piping will cost, even admitting, as we readily may, that "one man's experience is not necessarily another's." This difficulty, even if we do go in person, will be still in our way, and we can at most only gather from another's experience some idea as to what we ourselves shall be required to provide. There, we are assured, are gentlemen keeping the most accurate accounts, who may inform us with every facility as to not only what they gather, but what they expend. This same want is observable throughout the opening paper. Italian rye-grass in Ayrshire is cited to us as evidence as to what irrigation can effect. But this is not done by simple irrigation alone. Turn to Mr. Telfer as the champion of the system. On his farm of fifty acres we learn: "The sand on some of its extent has been heavily clayed, and has yielded heavy crops of wheat, but a great deal of it that I saw was as light a sand as was ever cultivated —a pure sand soil which the severe frosts of this winter have failed to make cohere. The manure applied to these acres consists of (1) an endless supply of water; (2) the whole liquid and solid excrement of 48 cattle in the byre, which are highly fed on food grown and purchased; (3) 10 cwt. per acre of artificial manure over the whole of the extent in Italian ryegrass, 6½ cwt. of guano per acre over the cabbage and mangold wurzel, and about 2½ cwt. per acre over the whole of the wheat. All these are after the rate of imperial measure. There are only 21 Scotch acres—that is, rather more than 25 imperial acres—under the irrigation system; the other part of the farm is managed in the ordinary way." This is anything but clear. How many are "these acres," that with an endless supply of water have so much more substantial matter? Are they the twenty-one only under irrigation, or in addition to them some more of the land that has not been clayed?

Then, again, in giving just what is wanted—"An History of an acre of Mr. Telfer's Italian Rye-grass"—how much more satisfactory it would have been to have let us know, not only what this acre produces, but what is the cost in doing so! Keeping such accurate accounts, how easy it might have been to draw up a debtor and creditor column—what we must charge per annum for these repeated dressings of guano and ammonia, what is to be put down as the share per acre of this manure from the cattle, the expense of application, and any other items that may be incident to the business. The history of an acre without these, particularly where figures so greatly abound, is but half a history after all.

We would not for a moment wish to prevent our readers giving this subject that attention it deserves. What, however, we do desire is, that they may be enabled to enter on the consideration of it with every detail before them. Results can only be properly estimated by the cost at which they are obtained; and we know the fate of the sanguine speculator who cited only his profits, while he never looked to his losses. We are the more induced to dwell upon this point from the rather extraordinary resolution agreed to by the members present at the meeting on Monday. By all means recommend the practice of our Ayrshire friends to the farmers here. It may be to their advantage where practicable to adopt it; but surely we have anything yet but the proof before us of this being "*an easy and cheap mode*" of culture!

On the other hand, we think we are justified in assuming, from all we have heard, that the process is attended with some difficulties at starting; while the means for carrying it on are certainly not based upon cheapness as an essential. More than this, in the rotation of crops we must not look to the rye-grass alone. Despite the declaration of there being now "no such thing as an exhausting crop," it is very plain that, to achieve what has been done in Ayrshire, the land will not only need well-paying while this crop is on it, but something considerable afterwards.

There is little doubt that with the grand proviso —a succession of good seed—Italian rye-grass will be found, under most circumstances, to well warrant its increased use. There is equally little question that, to obtain extraordinary produce, we must employ extraordinary means. It is the amount of these we yet want more clearly put before us. The weakness of the opening paper, we repeat, was, in not giving these sufficient consideration. On the contrary, we can congratulate its author as no longer attempting to defend absurdities, which must at once have died away had it not been for the strangeness with which they were persisted in. "Mr. Telfer's hay crop," we were requested to rank now as a forbidden word. We should wish to have seen it such long since. "Mr. Telfer makes little or no hay," said the *Mark Lane Express* months since, and everybody says so now.

LONDON, OR CENTRAL FARMERS' CLUB.

The ordinary monthly meeting took place on Monday, March 5, at the Club-house, Blackfriars; Mr. Shearer in the chair. Subject—introduced by Mr. J. C. Morton, of Upper Wellington-street, London—"The Cultivation of Italian Rye-Grass."

After a few introductory remarks from the Chairman,

Mr. John C. Morton said, it may be right to state at the outset of this paper, that my object in naming its subject for discussion, and in gathering all the information which I could upon it by correspondence with the principal growers of the plant, and by personal inspection of the farms in Ayrshire, and elsewhere, where it is grown, has not been to prove anything whatever with regard to *persons*. Of course, this remark will be understood by those who have read the angry discussions that ensued upon the late Tiptree gathering. I shall avoid all personality, whether in the way of praise or censure. No reference to past statements on the subject shall be made—statements which have been disputed, defended, and condemned, with a good deal of unnecessary temper—no attempt to determine where the credit is due, if there be any doubt as to the originality of this, that, or the other, in connection with the cultivation of Italian rye-grass. In what degree Mr. Dickenson or Mr. Rodwell, Mr. Lawson, Mr. Kennedy, Mr. Telfer, Mr. Mechi, and Mr. Ralston are copyists or originators I have not tried to ascertain. There is an aspect presented by the subject more important surely than the personal: I hope every one will agree with me in that; and, instead of trying to defend or to condemn what has been already said about Italian rye-grass, especially about the extraordinary crops of it at Myremill and Cunning Park, I have tried to forget it all; and, considering the cultivation of this plant simply as a subject of great agricultural importance on its own account, I have lately done my best to inform myself of the actual experience of its growers, in order that I might be able, through the London Farmers' Club, to call the attention of agriculturists generally to what so many of them now already perfectly know—the extraordinary merits of the Italian rye-grass as a forage plant. This may be proved, in the first place, by the rapidly-increasing sale it is receiving. It has been known to British agriculture for nearly a quarter of a century. In 1831, Messrs. Lawson first imported it; 160 bushels were that year shipped from Hamburgh, and sold at two guineas a bushel. The imports increased year by year; in 1840 they were 5000 bushels; in 1853 they were 40,000 bushels—by this one firm alone. Mr. Lawson writes to me as follows:—

"The first importation took place 24 years ago, viz.:—

In	Bushels.	Selling price.	
1831	160	42s. 0d.	per bushel.
1833	320	35 0	„
1836	1,000	15 0	„
1840	5,000	10 6	„
1841	6,000	10 0	„
1850	25,000	7 6	„
1851	28,500	7 6	„
1852	30,000	6 0	„
1853	40,000	5 6	„
1854	31,900	5 6	„

"The large increase in 1853 is attributable to a slight deviation in the usual channels of sale, or wholesale transactions having assumed an importance in that particular year, owing to trade arrangements, which it is not necessary to particularise. Our present year's importations are not yet completed, but we think they will not exceed 35,000 bushels. There is no doubt that the consumption of Italian rye-grass is progressively increasing—for independently of our own sales, other parties in the trade have also become importers—to what extent we cannot exactly say, but we have every reason to believe that our own imports represent three-fourths of the foreign seed consumed in this kingdom. Of home-grown seed we have no means of judging, but our long experience in the trade warrants us in saying that the foreign seed is to be preferred even at a higher price. No complaints have been urged against it, which is more than can be said of the English seed. The factitious value of this seed is owing to its being better cleaned than the foreign. There is not the slightest difference in the plant. The arrangements now made by us with the growers in Italy ensure its being perfectly cleaned. There can be no question but that the fact of foreign seed being ill cleaned induced cultivation in this country, and many growers have bestowed pains in preparing it for the market under their own names. Farmers should, however, be cautious in estimating the quality of the seed by the luxuriantly-grown samples from which the seed is said to be, and undoubtedly is, produced. This luxuriant growth having been superinduced by liquid manure, a disappointment results if the crop, with ordinary manuring, does not equal its parent. But we need not enlarge on this. As to the comparative breadth of Italian and common rye-grass, no one can speak; for not a twentieth part passes through the hands of the seedsman. Our own transactions in the latter have been to the extent of 95,000 to 100,000 bushels, ranging over the past five years. But this must not be taken as bearing the exact proportion to the Italian, so far as consumption goes."

But wholesale dealings are not so satisfactory a proof as those which represent sales to actual cultivators of the soil; and, on this point, Messrs. Drummond, of Stirling, tell me that their retail sales alone, in Stirling, during the last six years, have been 120, 136, 190, 220, 280, and 350 quarters respectively—an obvious testimony to the increasing reputation of a crop. In like manner, Messrs. Gibbs, the seedsmen to the Agricultural Society of England, tell me "the quantity of Italian rye-grass sent out by us increases every year, and the demand is at least double what it was seven or eight years since. The quantity, however, actually sown is no doubt much more than double, as it can now be obtained from nearly all the local seedsmen." Mr. Sutton, of Reading, tells me that their firm sold last year 1096 bushels retail, against 1161 bushels of other sorts of rye-grass; this is, of course, independent of all wholesale dealings, and of sales of both in mixtures for permanent grass. But perhaps the most curious evidence of the gradually but rapidly increasing estimation in which the plant is held is given by Mr. Rendle, of Plymouth, who has been kind enough to examine his books during the past fifteen years for me, and his retail sales alone of the seed during that time have been year by year as follows—in 1840 only 25 bushels, and this followed in successive years by 30 bushels, 30, 50, 50, 60, 70, 90, 100, 180, 240, 400, 500, 600, and 700 bushels per annum. In fact, as Mr. Rendle says, the use of the seed is not now confined to a few of the more enterprising cultivators; it is general, and everybody sows it. Well, then, seeing that the plant has already fully established its claims to cultivation, it is an easy task for me to advocate them. I wish, however, more especially to call attention to that method of cultivation which has been adopted on the liquid-manure farms in Ayrshire and elsewhere, and to the extraordinary results which have attended it. But before doing this, I must answer the questions of those who wish to commence its cultivation and its management in the ordinary manner. Italian rye-grass prefers the adhesive class of soils—loams and clays. The quantity of seed recommended for growth by itself, is 3 to 4 bushels per acre. Mr. Dickenson recommends 4 bushels; Mr. Sutton of Reading, and Mr. Drummond of Stirling, recommend 2½ only; their seed is, however, probably above the average quality. I fancy the Ayrshire practice may be the safest, which is to sow 3½ to 4 bushels per Scotch acre, corresponding to fully 3 bushels per imperial acre. This, I find, is Mr. Mechi's quantity. When sown with a mixture for permanent grass, 8 lbs. or 10 lbs. per acre is an ample share. When sown with clover, 1 bushel per acre, with 12 lbs. of mixed clover seeds, is sufficient. In that case, it should be sown as late as possible along with the grain crop. If it could be hoed in early in May, it would be best. If sown as early as usual, it would, by its rapid growth, materially interfere with the harvesting of the crop. But for a full crop, it is best sown by itself, *i. e.*, without a grain crop; and then, as soon after harvest as possible is the proper seed time. Mr. Drummond recommends 2 or 3 lbs. of Alsike clover to be sown along with 2½ bushels of Italian rye-grass, as early in autumn as possible. At the first cutting, early in summer, this Alsike clover was eighteen inches high, and the whole was a very heavy crop. Mr. Sutton recommends to sow Italian rye-grass by itself—making an exception, however, in favour of Trifolium incarnatum, if it be sown in August—a very large crop of both is obtained, and the Trifolium is made surer and more abundant for its nursing by the earlier rye grass. A great deal of the success of the crop depends upon the choice of seed. It may not be of a good sort, for there are varieties; it may be imperfectly ripened; it may be imperfectly winnowed; and it may be adulterated. Its weight varies from 15 lbs. per bushel up to as much as 28 lbs., which is the extraordinary weight named by Mr. Drummond. It is much adulterated with hair grass and common stable seeds; and its varying weight indicates how much mere husk is often mixed with it even if it be a genuine sample. Mr. Rodwell, of Alderton Hall, Suffolk, some years ago pointed out the necessity of selecting the right sort, showing that they differed very materially; and Mr. Sutton writes to me as follows:—

"Much of the misapprehension and diversity of opinion respecting productiveness of Italian rye-grass has, we believe, arisen from the assumption that there is but one kind of Italian rye-grass, or that all varieties possess the same properties, or nearly so; whereas, we have repeatedly proved that there are probably as many varieties of Italian as of English or Scotch rye-grasses, and that the productive and nutritive properties of some greatly exceed others. This we found to be the case with a kind we procured from Mr. Dickenson, then at May Fair, a few years since, as also another very productive variety, which, for distinction, we have kept under the name of 'Sutton's,' and the other, 'Dickenson's.' So great is the difference in the produce of these and that of other varieties of Italian rye-grass which we have sown, that we are not surprised at the great weight per acre grown by Mr. Dickenson with a copious supply of liquid manure. To the above remarks I may add, that some years ago a rather distinct variety was brought before the Council of the Royal Agricultural Society of England by Mr. Rodwell, which was of a darker green than other kinds, and having a brown tint to the ears of bloom or seed; it was a good variety, but, not considering it superior in quality to those above alluded to, we did not preserve the stock. Fresh-imported seed always produces a large bulk of grass the first year, but is generally foul with seeds."

On this subject, too, Mr. Drummond writes—

"Seed from Lombardy we find, upon the whole, the best, as from it we are always sure of it growing an early and luxuriant crop. Much of the British-saved seed is in its character and habit so like common rye-grass, that it is not one whit earlier. A great deal of it is sown on ordinary land, instead of common rye-grass, along with the barley crop, the seed of which, provided it has been the direct produce of Lombardy seed, may do; but if this be again sown in the same way, it will be greatly degenerated, and in a year or two valueless as Italian rye-grass. When we do make use of home-saved seed, we must have it from the direct produce of Lombardy, and saved the same year in which it is sown; *i. e.*, sown alone in April, and harvested the same season. We have proved dozens of times the inferiority of the general run of home-grown seed. Lombardy seed looks bad, and is slovenly 'cured,' and it does not vegetate equal to our own home growth, so that it requires to be sown rather thicker."

So much for the kind and quantity of seed and time of sowing. On the last point I may repeat, that it may be sown very late among corn; but it is best sown by itself, either as early as possible after harvest, when a first cutting is to be had very early next spring—and it has been even known to yield a cutting in November, and certainly a good bite for sheep—or in March, April, or May, of the following year, when (if sown in March) there will be a cutting towards the end of June. The plan is to clean the land and roll it hard, and sow three bushels broadcast, and bush-harrow it in and leave it. The plant, if properly manured, and that the liquid way is the proper one I cannot doubt, will keep down every other thing. As to the produce under ordinary management, it will yield three good cuttings in the year if watered with the water-cart as industriously as possible, and if the land be in good heart to begin with. But if watered copiously—as it can be only by a system of pipes and tanks and force-pump—you may have four up to eight cuttings, according to the state of growth at which you wish to take it. It will stand being cut later than ordinary rye-grass, for it does not become so woody at as nearly ripe, and it will do to cut very young also, and Mr. Dickenson tells me that he has cut it even ten times in one season. I do not refer at greater length to his experience, because he is soon to publish a pamphlet on the subject. If allowed to seed, Italian rye-grass yields a fair crop. I once sold 90 sacks, *i. e.*, 360 bushels, weighing 17 lbs. a bushel, off 19 acres, and this was not a good crop; it was a second cutting that year. The seed is difficult to save, from its liability to shed. The swathe was tied up in small sheaves at once, and stooked as wheat is, and carried at once to the board upon a large sheet in the field, where a couple of men could thrash it out almost as fast as a horse and cart could fetch it; two or three blows upon each sheaf sufficed to knock the seed out. That then is all that need be said about the ordinary experience of this crop. Mr. Mechi, who, as we all know, adopts the liquid manure system, states his management and experience of it as follows:—

"We sow 3 bushels of Italian rye-grass per imperial acre—broadcast with the seed-barrow on the wheat crop—before the last horse-hoeing, which works it in. As soon as the wheat is harvested, the grass is irrigated at the rate of 10,000 gallons per acre, which gives us abundant autumnal feed. Before Christmas it is again irrigated once or twice, and about the 20th April to the 10th May it affords an abundant mow. Last year on 6 acres of poor, stony, rocky soil we kept 100 fattening sheep from the 20th April to the end of August, the sheep never having been removed from the land. They were folded, and had rape-cake. This was the second year of the grass which had been several times mowed in 1853. The land was ploughed in November, sowed with white peas, which will be picked for the London market, and followed by turnips. I should say that the hoe and jet followed the sheepfold. I prefer taking broad-leaf plants after rye-grass rather than cereals. As a general rule, our rye-grass gives us abundant food in the spring, whilst our neighbours are sadly deficient. It also gives much late autumnal feed. When we mow, 10,0 0 gallons are applied after each cutting; without this *we have no crop* in the summer. More weight can be obtained by mowing than by folding; the latter interferes with the rapid growth of the plant."

I now come to the description of such of the farms in Ayrshire where Italian rye-grass is cultivated as I have seen. You are all aware that at several places in that county the system of irrigation by underground pipes for the distribution of liquid manure has been applied especially to the cultivation of Italian rye-grass. And such very extraordinary statements have been made about the results, both in the field and in the cattle stalls, of this mode of management, that I was sure, when this subject was named for discussion before the London Farmers' Club, that a great deal of its interest would hinge upon the truth or inaccuracy of the statements referred to. I went to see these farms, therefore, the week before last, in order to make personal inquiry into the subject, and so be able to speak this evening with the confidence of an eye-witness. There are five farms in Ayrshire where pumps and pipes are in operation for the distribution of liquid manure:—Myremill, about 8 miles east of Ayr, on the Maybole road, the property of Mr. Kennedy, a banker in Ayr, and occupied by Mr. Kennedy, his tenant; Cunning Park, a farm of 50 imperial acres, on the sea shore, one or two miles south of Ayr, occupied by Mr. Telfer; Enterkine, three or four miles S.W. from Ayr, occupied by Mr. Bell; Lagg, occupied by Mr. Ralston, a high-lying farm, nearly all arable however, some four miles from Ayr, on the south road which runs by Cunning Park; and a farm in the occupation of the Marquis of Ailsa, some four or five miles farther south. I saw Myremill, Cunning Park, and Lagg. Enterkine, I was told, was stiff clay land: those parts of Lagg and Myremill which I saw are what would probably be called a somewhat brashy loam, and Cunning Park is a light sand, Mr. Kennedy, the tenant of Myremill, has for many years had experience of the value of manure applied in the liquid form by water-cart both on common rye-grass and Italian; and it was out of a conversation with his landlord in which his own experience, along with Smith of Deanston's plan for distributing the liquid sewage of towns, was discussed, that the plan of underground piping for distributing the farm liquid was determined on. This was seven or eight years ago. Myremill is a farm of 300 imperial acres, and of these 320 are furnished with underground piping, extending, some of it, to the distance of near a mile from four tanks on the farmery, which together hold 300,000 gallons. The farmery is placed on the summit of one of the knolls or undulations of the land, and its tanks are thus above most of the land of the farm; but when the pump is in operation its force, whenever more than sufficient for the work of distribution whether on the fields below it or above it, opens the way to a higher tank at a distance, in which, therefore, any surplus liquid is accumulated for use by gravitation at any future time. The supply for these tanks is as follows:—water *ad libitum*, pumped into them from a neighbouring stream—the liquid of some 150 cattle kept pretty constantly throughout the year in byres—the drainings of the open yards and sties—and the whole manure of 450 sheep kept in a house on boards, the spaces beneath being flooded out occasionally, just as they are at Tiptree, as most of us have seen. Besides this stock of manure, Mr. Kennedy purchases at 6d. a gallon the concentrated gas-water of the neighbouring gas-works of Ayr and Maybole, and of this he procures 800 to 1,000 gallons in the year. All the liquid made during at least nine months of the year and all this gas-water is put on 84 imperial acres of Italian rye-grass. The liquid made during about three months of winter is poured on the fields intended for mangel wurzel and other green crops. These, then, are the means employed at Myremill. Now for a word on Mr. Telfer's farm. As you approach Ayr by railway from the north, the sea upon your right is hidden by a waste of sandy hillocks but imperfectly bound together by the wiry roots of the scanty grass with which in patches here and there they are covered. This is, in fact, a district of blown sea-sand, in which rabbits burrow. On your right, again, the same sand has been levelled, and is cultivated, and, by dint of manuring, is made to grow turnips and other food for sheep, which there, as everywhere, at length impart fertility. Through this sand the water of Ayr finds its passage to the sea, and on its banks the town is built. South of the town the same kind of soil occurs, in a narrower line however, along the shore, and it is soon altogether stopped by the high lands, on the summit of which, close by the sea, lies the farm of Lagg—Mr. Ralston's occupation. Before you reach these high-lying lands, and before you leave the sandy tract, you come, as you travel southwards, upon Mr. Telfer's farm of Cunning Park. It is an old enclosure from the blown sand of the shore—50 acres in a rectangle lying between the south road and the sea—formerly, no doubt, a sandy waste, but at what date I do not know; and while the difference which *to the farmer* it exhibits from the wilderness it was is at least as great as that exhibited by the richest specimens of fertility I know, that difference is in this case wholly due to art, and not to Nature. The sand on some of its extent has been heavily clayed, and has yielded heavy crops of wheat, but a great deal of it that I saw was as light a sand as was ever cultivated—a pure sand soil, which the severe frosts of this winter have failed to make cohere. The manure applied to these acres consists of (1) an endless supply of water; (2) the whole liquid and solid excrement of 48 cattle in the byre, which are highly fed on food grown and purchased; (3) 10 cwt. per acre of artificial manure over the whole of the extent in Italian rye-grass, 6½ cwt. of guano per acre over the cabbage and mangel wurzel, and about 2½ cwts. per acre over the whole of the wheat. All these are after the rate of imperial measure. There are only 21 Scotch acres, that is, rather more than 25 imperial acres, under the irrigation system; the other part of the farm is managed in the ordinary way. I pass now to Lagg, some three miles further south, and probably between two and three hundred feet above the level of the sea. The farmery here is high above the land under irrigation—so high that the liquid from the cattle runs down some 40 or 50 feet, I should think, to the tanks, where it accumulates for use by gravitation on the fields still lower down. These fields, extending over 60 imperial acres, are on a slope, the upper part probably 70 or 80 feet above the lower, but all sufficiently below the tanks to give pressure enough for distribution of their contents through flexible pipes from the fixed hydrants. The soil here is much the same as at Myremill—a good, but somewhat brashy loam, worth, I dare say, 35s. an acre. The manure used upon the land under irrigation is the liquid from 60 large cattle and 20 horses, with nearly 2 cwt. of artificial manure per acre washed into the land after each cutting of Italian rye-grass. The extent under Italian rye-grass at Lagg each year is 12 acres, and this receives all the liquid except during two or three months of winter, when the land for root crops gets a dressing. The extent sown each year at Myremill is 42 acres, and at Cunning Park 4 1-5th acres. This, let me say, is sown in March or April, or late in autumn; kept on through the following year, and until the end of summer in the year after that. So that going in the summer time you would see at Myremill 42 acres of old grass and 42 acres of new grass, and at Cunning Park 4 1-5th acres of old grass and 4 1-5th acres of new grass, *i.e.*, 70 Scotch acres on the one farm, and 7 Scotch acres on the other. As to the mode of sowing, I will give Mr. Kennedy's practice. He ploughs up an oat stubble in autumn, puts the grubber and the harrow through it, and gets it clean; then he rolls as hard as he can, sows 4 bushels of seed broadcast—that is, 70 or 80lbs. per Scotch acre—and brushes it in. That is the whole affair. It comes up, gets a flooding with the liquid (about 6,000 gallons) as soon as well above ground; is cut, if sown early enough, the first time late in April, and yields three or four cuttings, and after each cutting gets soaked with the liquid manure. It yields again three cuttings, or perhaps four next year, and is then ploughed up and goes into the regular rotation of the farm. The five years' course prevails there—1, wheat; 2, turnips; 3, oats; 4, seeds, mown; and 5, seeds depastured; and the Italian rye-grass occupies perfectly and without disturbance the place of the two years' seeds over forty-two acres of the land; and that generally is the plan followed on the other farms. Mr. Telfer has, indeed, occasionally for several years grown Italian rye-grass after Italian rye-grass, and found it answer perfectly, but I understood him to say that he too grows it as a general rule in succession with other crops. And now as to the produce obtained from Italian rye-grass under this cultivation. I will commence with Mr. Telfer's case; and let me here say that I have never been on a farm where such a detailed record of every operation and its result is kept as is kept at Cunning Park. The result of this is, that the order and cleanliness apparent everywhere are most remarkable. I would rather finish the biscuit I had dropped in Mr. Telfer's cow-house than if I had to pick it off the floor of many a cottage I have visited. A record is kept of the daily food consumed, and of the daily produce of the four lots of cows in which the whole are arranged—forty-seven cows of the Ayrshire breed and one bull occupying the house. They receive, while on Italian rye-grass fully, four feeds daily, amounting to from 2 tons to 50 cwt. of the grass among the forty-eight. The grass is allowed to stand till on the point of putting forth its seed stem; it is then more substantial food, containing less water and more starch and sugary matter. When younger, it contains, along with more water, more of the substances corresponding to the gluten of flour, and which chemists tell us resemble the fleshy part of animal matter. Those who wish to make flesh by their consumption of Italian rye-grass may therefore be right in cutting frequently and having it younger. That is Mr. Dickenson's plan. Mr. Telfer makes butter, and is right in cutting it less frequently—often only three, sometimes four, or at most five times in the year. He has a drier food in consequence. His object is to have a food for his cows containing 20 to 25 per cent. of solid matter, and he mixes chaff and hay and meal with his mangel-wurzel during winter in order to obtain this result. His opinion of the relative merits of the younger and the older grass is founded on analyses by Dr. Anderson, of Glasgow, from which it appeared that the Italian rye-grass seventeen days old, seventeen or eighteen inches high, and weighing about nine or ten tons per acre, contained 86 per cent. of water; and when five weeks old, or three to three and a-half feet high, and weighing twenty tons an acre, only 74 per cent.: in the former case 3 per cent. of the protein compounds corresponding to fleshy matter in the animal, in the latter only 2½, while the starch and sugar present in the former were only 5½, and in the latter 10½ per cent. It is no part of my present business to state the winter feeding of this cow-house, or to do more than relate what share this eight and two-fifth acres of Italian rye-grass have in the maintenance of the live stock. I may say, therefore, that the Italian rye-grass is, as a general rule, the whole maintenance of the stock so far as green food goes during the months of May, June, July, August—that it is most of their maintenance in September—and that it is half their maintenance in April and October. This was the case last year, when eight and two-fifth acres of Italian rye-grass, half of it sown in the spring of last year (for the seed was not got in in the autumn of 1853, as usual) yielded 270 tons of green food, besides a crop of hay off the old grass, which was left for hay in the autumn, the younger crop being then in full bearing, and sufficient for the feeding of the cattle. Now, it is very little to say that forty-eight cattle are maintained—that 30,660 gallons of milk (for that is the average year's produce from the forty-seven cows)—that 30,660 gallons of milk were made upon fifty acres of land, half of it under this irrigation system—that a quantity of milk, worth, at 2d. a quart, upwards of £1,000, or, at 1s. 4d. per gallon, £2,044, was made upon so little land—because the question remains where their food came from; and there is many a London dairyman with no land at all that maintains a larger herd and makes a larger quantity of milk. I will therefore just add the cropping of the land last year. Of the twenty-five acres under irrigation there were eight and two-fifth acres in Italian rye-grass, yielding 270 tons of green food besides a crop of hay; there were three and three-fifth acres in cabbage yielding 150 tons of cabbage, £10 worth of which were sold; there were seven one-fifth acres of mangel-wurzel, yielding 250 tons, 80 tons of which were sold at from 23s. to 30s. per ton, according to the season; and there were nearly six acres of wheat, which yielded the extraordinary measured produce of 405 bushels. And it *is* an extraordinary thing to say that the twenty-five acres under irrigation wholly kept those forty-eight cattle—that is to say, that the grain, and mangel, and cabbage sold will pay the hay and linseed, bean, and manure accounts. That they will not do so another year is probable, seeing that the greater part of the wheat sold at 10s. per bushel. Mr. Telfer writes me—"The food obtained for my cattle from the other 19 Scotch acres—that is, nearly 25 imperial—not under irrigation, is charged against them at the price it can be purchased in the market (sixty feeds, *i. e.*, 30 tons of grass, and a quantity of hay, with oats and oat-straw); I expect my sales of mangel, cabbage, and wheat to cover this as well as all other purchased food." And in another letter I have received from him he says—"My calculation at present is that the grain, mangel, and cabbage sold off this farm will pay for the hay and linseed, &c., and manure accounts." Let me give the history of an acre of Mr. Telfer's ryegrass. It is sown in autumn, as I said of Mr. Kennedy's, about 4 bushels per acre, and brushed in and watered, and left till spring. Sometimes it is very late; and when I was at Cunning Park the week before last, it was barely up, and had been cut down by the frost, and might have to be sown again. In that case it would be, as it was last year, a spring sowing; in that case its first flooding would be followed by a first cutting in perhaps June, when 10 or 12 tons per acre might be expected from it. Immediately after cutting, between 3 and 4 cwt. per acre of mixed Peruvian guano and sulphate of ammonia are sown upon it, and 1 inch or 100 tons per acre of water are poured upon it through the pipes, containing such a share of the liquid excrement of these 48 cattle as belongs to the period since the last pumping took place. Mr. Telfer attaches immense importance to this immediate manuring and flooding with water; and he lets the water on direct from the pipes to the land: he does not send it flying in a shower though 40 or 50 yards of, it may be, dry air, which would run off with half its excellence, but he sends it directly to the roots of the plant. The flooding follows the cutting immediately, the Italian rye-grass uses the ammoniacal manure especially during the early stage of its growth, and by applying the liquid at once it gets the start of all weeds. In five weeks the land will be covered 3 feet high with a thick luxuriant growth, weighing dry, *i. e.*, without dew or rain upon it, at least 16 to 20 tons per acre. This is cut and followed by another manuring in a similar manner, and a third cut of 16 to 18 tons may be expected pretty early in September, and a further manuring will give you 10 or 12 tons per acre towards the end of October. In spring another dressing of the water gives a cutting towards the end of April, and a second and third cutting will be had, together weighing 45 to 50 tons per imperial acre, by the end of August. The land is then allowed to grow the crop unassisted, and a crop of hay or seed may be had in the early part of October, after which it is broken up. During the two years that acre will have yielded between 80 and 100 tons of green food per acre, in seven cuttings, by the use of a ton of guano, sulphate of ammonia, and nitrate of soda washed in with 700 tons of dilute liquid. I am not stating this produce as an actual history, but as what I believe to be a moderate estimate, founded on the information I have obtained, of what any one of us may get under favourable circumstances if we adopt Mr. Telfer's system. Mr. Telfer states the produce, as actual history for one year, of his 7 Scotch acres—that is of 3½ Scotch for the two years of their existence—at 270 tons of green food besides the hay—*i. e.*, less than 80 tons per Scotch acre for the two years. But it is right to give the following facts in connection with these 270 tons from 7 Scotch acres. 3½ Scotch acres were sown in the spring of 1853, and 3½ Scotch acres were sown in the spring of 1854. The former yielded 3 cuttings in the former year and 2¾ in the latter year, and it was then allowed to seed; and the 3½ acres which had been sown in the latter year yielded 3 cuttings: so that, taking the latter year alone, 5½ cuttings were obtained. The old grass yielded 2¾ cuttings; that is to say, during the third cutting in the beginning of July the scythe was stopped, and the liquid manure following it was also stopped—the mowers being sent in to the younger grass sown that spring, as it would otherwise have gone to seed. It will be seen, then, that owing to the seeding in both cases being in the spring, and especially owing to the manure being stopped so early in the season, only 5¾ cuttings in all were obtained in the year from the two plots of one-year-old and two-year-old grass. In calculating what, under more favourable circumstances, might have been, I think that *that* ¾ of a cutting only has to be deducted, as it alone of the older grass can be called contemporaneous in its growth with the first cutting of the new, and thus 5 full cuttings might have been obtained from that 3½ acres of the two-year-old grass in one year. It is, however, of little importance, and there is little need to speculate on what might have been. The actual history of that produce, crippled as it was, is extraordinary enough. My version of what might have been is, nevertheless, corroborated by the following actual history of facts, which Mr.

Kennedy gave me as the produce of 16 Scotch acres of Italian rye-grass last year, as follows:—On April 20 a cutting commenced, and on each day a perch was measured and its produce —cut if possible dry—was weighed dry; and the weight per acre calculated by a perch weight ascertained each day was 16 tons; the second cutting, ascertained in like manner, was 25 tons; the third was 17½ tons; the fourth, in September, was 16 tons; and after that a foot high of grass was eaten down by sheep, which, if it had been cut, would have been 8 or 10 tons per acre. This was 74 tons per Scotch acre in *one* year. That was the first year of a crop sown in September of the previous season. There must be added to it the two or three cuttings of the next season before we get the quantity that one acre will have yielded in the two years, corresponding to the two years' produce which I have estimated at 80 to 100 tons per imperial acre. Mr. Telfer's farm is, as I have intimated, a dairy farm. He finds it his interest to grow food at this high pressure rate, although he is 400 miles from the market for his butter. His butter comes up to Jermyn-street, and I believe it fetches as high a price as any in the market; and I believe that, notwithstanding the expense of carriage and the high pressure under which it is made, it reaches Jermyn-street with as little on its head per lb. to answer for, with as large a balance, I mean, per lb. of profit to the maker of it, as any that is sold. We surely all agree with Mr. Telfer that the power through this Italian rye-grass of producing a large quantity of vegetable matter where milk brings so high a price as it does in the neighbourhood of large towns, becomes a far more important consideration to persons situated near London, than it does to the tenant of an Ayrshire farm. And I quite expect, as the result of this day's meeting, to find that Mr. Telfer's practice is being copied in the neighbourhood of London. I have yet to say a few words of Mr. Kennedy's farm, where Italian rye-grass goes to the manufacture of meat. It is, as I have said, 750 Scotch acres, or 900 imperial acres in extent: 180 acres are in wheat, 180 acres in turnips, swedes, and mangel wurzel, 180 acres in oats, 180 acres in one-year-old seeds, 180 acres in two-year-old seeds. Of these 180 acres kept two years in grass, 42 are Italian rye-grass; 420 of the 900 acres are under the system of irrigation by underground pipes for the distribution of the contents of the tanks. The green food of this farm, along with certain portions of rapecake and beanmeal, and along with steamed straw, keeps a herd of 253 large cattle fatting to 7 cwt. and upwards (a very even lot of cattle, under capital arrangements as to feeding and accommodation, I saw there the other day), 450 sheep (improved cheviots), fatting to 16 or 18 lbs. a quarter, and selling for 42s. to 47s. a-piece; and from 150 to 200 pigs and 25 large Clydesdale cart-horses. These are besides the sheep in the fields. Three such lots of sheep are passed through the hands in the year: the cattle may be kept longer—more nearly five months than four on an average; but that stock, excluding the sheep in the fields, is the average quantity constantly on hand, and 42 acres of young Italian rye-grass and 42 acres of two-year-old Italian rye-grass keep them during about five months of summer. The cattle get about 6s. or 7s. worth of rape-cake and bean-meal per month a-piece. The sheep get half a pound of the mixed food a day, or not much more than 8d. or 10d. worth a piece per month; and besides that from April till October they get only Italian rye-grass. The sheep eat from 12 to 18 lbs. of this green food a day, and the cattle from 100 lbs. to a cwt. a-piece. It is the universal testimony there that the Italian rye-grass never palls upon them. They get tired of clover, but not of this grass. The sheep are on open boards in pens, 12 feet by 6, holding 10: there are two rows in the width of a long L-shaped building, with a central passage. They looked healthy, comfortable, and prosperous. The labour of attendance on 450 sheep so kept is only 16s. a week, the wages of a man and woman who supply the food. The labour of providing the Italian rye-grass for all the stock (cutting and carrying it from the field) is done by four horses constantly employed in carting, and two men constantly mowing during the season, besides women raking. Mr. Kennedy states that he will undertake to keep 70 to 80 sheep per Scotch acre for five months of summer on Italian rye-grass cultivated in this manner. This is 60 sheep per imperial acre. They fatten to 18lbs. a quarter. Their consumption may be 16lbs. a day on the average, besides the ½lb. of rapecake and beanmeal. 960lbs. of green food daily for five months is 64½ tons of green food per imperial acre; and that, I do not in the least doubt, is not only a possibilty as an individual fact, but it is a possibility as an average experience. Besides the flock of sheep—viz., 450 in the house—some seven sheep per acre are kept upon the clover during summer, and 3,000 sheep in all are sold off the farm to the butcher in the year. How great an auxiliary the Italian rye-grass is to the general interests of the farm, appears in the quantity of manure which the great stock kept on it during summer enables to be made. Mr. Kennedy had 7,000 cubic yards of manure, in made and measured heaps, upon his farm last spring. His plan is, as I have said, to apply gas-water with the liquid manure. At every dressing, and there are often two after each cutting, he puts 20 gallons of the concentrated water per acre into the tank from which the liquid manure is to be taken; and this, with 5,000 or 6,000 gallons per acre, is the usual dressing. That the liquid is of immense importance is proved by an experience of Mr. Ralston, at Lagg, where two dry top-dressings of guano were followed by but two cuttings in the year; while with the liquid, some 5,000 or 6,000 gallons per acre, repeated twice or thrice after each cutting, four cuttings were obtained; and, as Mr. Ralston put it, the grass grew 12 feet in length during the season. Now, I do not wish to hold up the practice of these Ayrshire farmers as a foil or contrast to that prevailing anywhere else. There is many an illustration of the enterprise and energy of our common Saxon blood to be found, not only on individual farms, but over whole districts, and even counties, both in England and in Scotland. These instances of successful cultivation of Italian ryegrass are to be taken as independent histories; not for the purpose of putting any other practice in the shade—not for the purpose of comparison or contrast at all, but simply for consideration on their own merits. I have not given the cost of laying down the pipes, and pumps, and tanks—that varies with the cost of iron, and with fifty other things; and one man's experience is not necessarily another's in another place and at another time; and it is not likely that any person determining to enter on this plan will do so without personal inquiry into this aspect of the subject. All I have tried to do is to show that an enormous stock per acre is kept upon Italian rye-grass cultivated in this manner—so large a stock, that I think I have given good reasons why any tenant farmer, with an interest in his land secured to him long enough to render an outlay of the kind required prudent, should go north and inquire into these facts for himself. I believe they may be paralleled in the neighbourhood of London with even greater profit than is reaped by Mr. Telfer in the neighbourhood of Ayr. The original character of the land seems to be of little importance. Mr. Bell, of Enterkine, has pipes under 40 acres of what is there called stiff clay land; and I was told that he believes he cut 100 tons of ryegrass per Scotch acre last year. Mr. Telfer, on the other hand, grows his great produce on the lightest sand. The great advantage of the plant is this, as Mr. Telfer puts it: that you get a rapid certain growth when placed in favourable circumstances as to liquid manure; that there is a much longer time during which it is palatable for stock (for it is longer of getting dry and woody than any other rye-grass); and that any soil with ammonia-and-water-retaining powers can be made to produce as large returns as the richest and most easily managed soils. If any one shall consider it worth his while to inquire further into the practice prevalent at Myremill, Lagg, and Cunning-park, it may be an encouragement to him to say that I found Mr. Kennedy, Mr. Ralston, and Mr. Telfer as cordially frank, and ready to meet my many questions, as I could possibly have wished—as "ready to do good and to communicate" as any men I ever met. It may be right to add a word or two on the hay made from this plant. It is, of course, under its ordinary management, as proper for conversion into hay as any other rye-grass—more proper if excellence for this purpose depends upon abundant produce of palatable food. But under the irrigation system, where the second cutting follows so quickly on the first—where such very heavy, almost unmanageable, produce is obtained, and, above all, where the success of the management depends upon the land being flooded with liquid immediately upon its being cut, it is not advisable to make hay. Hay is made from it, then, only in such cases as that described by Mr. Telfer, when a cutting of the old grass remains unfinished, while the first cutting of the new is ready—or whenever the growth accidentally or by mismanagement overtakes the consumption. Then that which cannot be consumed at once is cut and made into hay—and very good hay it makes. You will perhaps expect that when speaking about hay, I should make some reference to Mr. Telfer's hay crop, about which he spoke to Mr. Caird and me at Mr. Mechi's—and to the consequent statement which produced so much excitement then and subsequently. I am not, however, going to do anything of the kind. I submit that if any one shall insist upon investigating that, and ascertaining here and now what the exact nature of the statement was, and who is responsible for it, he will, for the sake of mere idle curiosity, be doing his best to destroy the usefulness of the discussion which may follow this paper; for the angry feeling which has thus been raised, and probably would be so again, is not the best in which to arrive at truth; and I hope that the London Farmers' Club will, by their resolution this evening, affirm the importance of the Italian rye-grass as a forage plant, especially for use in the green state for feeding cattle. I hope too that they will recommend its cultivators to inquire, with a view to imitation, into the method of management adopted on the Ayrshire farms to which I have referred. One further remark in conclusion:—It is but a century since men lived on salted meat alone during the winter months; the summer season was the only time when stock was fed or could be fattened; the introduction of the turnip husbandry has changed all that, so that on many an arable farm more food is now provided during the winter months than there is for them during the summer, especially during the early part of it. The growth of rye has been recommended as the remedy for this; and winter vetches, cabbage, rape, and early turnips are the crops which have been used to supplement the deficiency of the summer produce. I believe there is no plan so efficient for this purpose as the growth of a few acres of Italian rye-grass, under irrigation, near the steading. Eight or ten acres of it, under the liquid manure system, will yield an enormous produce of it, and the manure that can be made by its consumption will be a welcome addition to the powers of the farmer in the autumn cultivation of his stubbles for the green crop of the following year.

Mr. Robert Baker had come to this discussion with few other observations to make than such as might be suggested by the able paper which they had just heard read. The subject matter under consideration was, perhaps, one of the most important that could engross the attention of the farmers. He confessed, however, that when it presented itself to the public notice, it came in a character so questionable or fabulous that it was not regarded with the attention that was certainly its due. Setting aside all prejudice, he felt that on this occasion he should be but fulfilling his duty as a member of the Central Farmers' Club by coolly and dispassionately touching upon some of the points in connection with the astonishing plant to which Mr. Morton had referred. That it was an astonishing plant, and that there were many varieties of it in existence, no one could doubt, after listening to that gentleman's paper (Hear, hear). Indeed, he was not aware until now that the varieties were so numerous as Mr. Morton had stated, and as Mr. Lawson and others had before asserted; although he had himself observed that the plant exhibited many strikingly distinctive characteristics. Its first introduction to his (Mr. Baker's) notice was, he believed, about the year 1840. It had then begun to attain some celebrity. A bushel was procured for him by a friend; but, arriving too late to sow with the spring crop, which was the customary mode of sowing grass in Essex, it was reserved for the autumn. Owing to some oversight, however, it was neglected until all his turnips had been put into the ground and come up. But he was determined even then to make the most of it, and accordingly sowed the bushel of seed upon half an acre of land, where the turnips had come into plant, harrowing up the turnips in order to ensure the grass. The sowing took place in the first week in August, and on the 12th of May following a rod of it weighed 112lbs., and on the 20th of the same month a rod of it produced not less than 168lbs (hear, hear). This result, be it observed, was achieved without the application of any extraordinary means, except that which had been applied for the production of turnips—something at the rate of 15 to 16 loads of farmyard dung per acre, the soil being alluvial; and such was its astonishing growth that, before it had arrived at maturity to produce seed, he cut a portion of it which reached over his head, and descended to his shoulders, and he afterwards exhibited it at Chelmsford market, where it was regarded by the farmers as a most wonderful plant (Hear, hear). Since then he had never been able to obtain so large a growth, and it struck him that perhaps it had degenerated, but never until to-night that there were different varieties. Possibly the seed he first used was procured from a district where it was better grown; perhaps, also, it was of a superior sort to that he had sown since (Hear). He had always found a difficulty, in growing Italian rye-grass, to ensure a good plant. Whether from the nature of the soil or climate in Essex, there was far more difficulty in obtaining a plant of that grass than any other description of grass. So far as getting a pure stock of it was concerned, there was no other grass with which he was acquainted from which so pure a stock could be obtained as Italian rye-grass. If it were sown in the ordinary way that other grasses were sown, and a cutting was taken off it in summer, for foddering or otherwise, none but Italian rye-grass would form a stock for second cutting. With this knowledge, which he had gathered from experience, he had invariably mown his Italian rye-grass twice for seed in the same summer. The second cutting he had applied to the production of seed for the ensuing summer; and thus he had succeeded in procuring a truer stock than by any mode of purchase. That it degenerated he had no doubt; but then it was the nature of all plants that had been long grown on the same soil to degenerate; consequently, it might be well to revert occasionally to the original stock in the country from which it was imported (Hear, hear). In the case of the Tartarian oat, for instance, they might have remarked that upon its first introduction it grew entirely on one side, but if it were grown continuously on the same land it assumed the character of the Siberian oat, growing nearly round the whole stem. If, then, the oat degenerated, as well as other plants, so also might the Italian rye-grass to even a greater extent; it was important, therefore, that this club should take the opportunity of investigating that point, obtaining seed from Mr. Lawson and other gentlemen who professed to have the varieties which grew such extraordinary crops, and so convince themselves that they had been cultivating the wrong description of seed. The proper time to sow Italian rye-grass was early in the autumn; indeed that was the best time for all grasses, for he had found by experience that the laying down of land with grass was better effected in the autumnal than the spring months (Hear). If they sowed Italian rye-grass with an early grain crop—Lenten corn as it was termed in his neighbourhood—in a moist summer, it would grow so fast as to interfere not only with the harvesting, but the production of the crop too; but if they wished to obtain rye-grass for an early cutting, he would say that, pursuing the same plan as for turnips, about Midsummer was the proper time for laying the foundation of a beneficial crop in the following summer. With regard to the application of liquid manure, he had never yet had the opportunity of testing its effects, except on a small scale in gardens and so forth. He had no doubt that Italian rye-grass was one of the grossest feeders of any plants—once a plant of it was grown on a farm, they never lost it. (Hear) It was sure to make its appearance somewhere. And if a single plant of it were pulled up, they would find as much fibre at its root as would fill a peck measure. This was proof sufficient of the extent to which it threw out its roots, and that it was a very gross feeder. Of course, with such a large number of sponges, it was enabled to appropriate an astonishing quantity of manure. For himself he was inclined to the opinion that this description of grass was admirably adapted for dairy purposes and for growing of stock of every kind; but he doubted if rye-grass, forced in an extraordinary manner by means of liquid manure, would be best for the fattening of cattle, and making hay of first-rate quality, however successful the farmer might be, as regarded the weather in securing it. For the more succulent a plant happened to be, the more water did it contain. Thus it is with mangold wurtzel, which contains from 80 to 85 per cent. of water; so also with the turnip: white turnips especially held a very large quantity of moisture, more indeed than swedes; and swedes less than mangold wurtzel. If this water were extracted, it left behind a very small amount of nutritious matter in proportion to the bulk obtained. He inferred, therefore, that just as they increased the succulence of Italian rye-grass, and supplied it with a large amount of moisture, so would they diminish the nutritious quality of the plant per cent. on the whole. The question certainly came before them with such force that one could hardly comprehend how it was possible for a single acre of land to produce from 60 to 65 tons of any description of produce whatever, except, perhaps, cabbages or mangold wurtzel, which might be forced to almost any extent. They all knew that mangold wurtzel, which on ordinary soils grew 15 or 16 tons an acre, and cabbages which produced five or ten tons more, might by the application of manure be made to produce from 60 to 70 tons per acre. In fact, instances had come under his notice of even a larger amount of production than that. (Hear, hear.) Assuming that a piece of red—the broad-leaved—clover would produce from four to five tons per acre of hay in two cuttings, and that it would take four tons of Italian rye-grass to make one ton of hay, he presumed that it would take three tons of clover only to produce one ton of hay; and if five tons of hay could be produced from an acre of broad-leaved clover, and he knew that had been effected without the application of extraneous manure fifteen tons per acre had been produced in a green state in two cuttings, then, if by possibility the two cuttings could be converted into four, and the four were equal to the two in point of weight, they would be actually approaching the quantity said to be grown by Italian rye-grass. He confessed that he was not more exempt from prejudice than other persons; and having been long accustomed to see the ordinary grasses producing from five to six and seven tons an acre at the utmost, the announcement came with startling effect on his mind when he was first told that from fifty to sixty tons might be grown on the same quantity of land. It was something, in short, that then seemed scarcely to be credited or comprehended. (Hear.)

Mr. **Sidney** wished to give the club the advantage of some notes which he had taken from an extremely valuable work on this subject, which was not referred to by Mr. Morton, and which corroborated what that gentleman had said. It was well known that the cultivation of Italian rye-grass, though a novelty in this country, had been carried on in Italy for a vast number of years. Irrigation on scientific principles could be traced in that country for four centuries; and for nearly forty years there had been a regular distribution of the sewage of Milan over the adjacent country. Not long since, the East India Company sent Lieut. Baird Smith, an officer of engineers, to Italy, to investigate the system of irrigation pursued; and that gentleman made a report, which contained a vast quantity of useful information. It appeared that in the neighbourhood of Milan about 15,000 acres of land were laid out in a scientific manner for irrigation with the sewage of the town. In the best meadows, that was to say the meadows which were irrigated with the best manure, the crops were cut four times a year—viz., in November, January, March, and April; and three times for hay—viz., June, July, and August; while dairy cattle were fed on the land in September. The result was a production of 50 tons per acre under ordinary circumstances; and when the land was manured with the best Milan sewage, from 67 to 75 tons, besides the pasturage. The soil consisted chiefly of deep gravel, overlaid by sand. The sewage was distributed by being passed over the grass fields during the winter months in the form of a thin film of water, which was constantly running; in the summer months liquid manure was only applied in the manner mentioned by Mr. Morton—namely, immediately after cutting—it being considered highly injurious to apply it during hot weather. He would only add, as regarded the comparative amount of production, that in the same country only from 24 to 25 tons were obtained by irrigation merely.

Mr. **Mechi** had said so much about sewage and irrigation of late, that but little was left for him to say on that occasion. The difference between an abundant supply of liquid manure and the non-application of such manure was that between having three crops and having no crop at all after the first cutting. He trusted that that discussion would promote the application of the sewage of the metropolis to the fertilization of the districts around it. Many years could not elapse before that would be witnessed on an extensive scale. If farmers wanted to increase their profits, they should lay down pipes, and secure an abundant supply of summer food. There were certain periods of the year in which they obtained neither green food nor its result—manure; and the consequence was that the farm was not in such a state of preparation for cereals as it would be under an adequate application of liquid manure.

Mr. **Moore** said, as he was an old grower of Italian rye-grass, perhaps his testimony on the subject might be considered of some value. When Mr. Kennedy first contemplated laying out his farm to be dressed with liquid manure, he recommended him to cultivate Italian rye-grass, and in support of that recommendation referred to the experience of Mr. Dickenson, of Willesden. Mr. Kennedy at first objected that, the climate of Ayrshire being damp, it could not be expected that the result would be the same there as in the warm climate of the neighbourhood of London; but that objection was overruled, and the experiment was most satisfactory. What made the case the more remarkable was, that the farm was most inconveniently situated for the application of liquid manure. Having himself cultivated Italian rye-grass for some years as a biennial, his experience bore out Mr. Baker's declaration that the best period for sowing was the autumn. It ought to be sown early enough to acquire sufficient strength to resist frost (Hear, hear). In this respect, there were advantages in that neighbourhood which did not exist in Scotland. The harvest was here generally about a month earlier than in the north; spring vegetation was also earlier; and if Italian rye-grass produced such a bulky produce in Ayrshire, where the summer was shorter and the spring later than in this part of the country, he had no hesitation in saying that, under similar management, an equal application of liquid manure would result in an excess of 50 per cent. over the production of Mr. Telfer or Mr. Kennedy. That view was, he believed, sustained by the actual production of Mr. Dickenson, of Willesden. He would further observe, that any one who attempted to cultivate Italian ryegrass without irrigation would be disappointed. The crop was more adapted for irrigation than almost any other that could be mentioned. There were different varieties of Italian rye-grass, attended, of course, with different results; but, on the whole, no grass with which he was acquainted reproduced itself so rapidly with the application of liquid manure. Another great advantage connected with it, was, that it would not purge or scour cattle. They all knew that clover required to be managed with great care, on account of the influence which it had on the health of cattle.

Mr. **Baker** observed that, as fodder, clover did not scour.

Mr. **Moore** admitted that, after it had acquired hardness, it would not scour; but he had not found Italian rye-grass producing that effect under any circumstances.

Mr. **Moore** would only add, that he confidently anticipated the speedy arrival of the time when that which was now polluting the water of the Thames would be applied to the fertilization of the land in the vicinity of London. He was quite satisfied that Italian rye-grass was well adapted to enter into a rotation in agriculture. Most farmers, he believed, had discovered that clover could not be repeated on the same soil without a number of years having intervened. Italian rye-grass, viewed as a substitute for clover, would come in equally well for soiling and for feeding stock in summer.

Mr. **Bradshaw** had been for several years a cultivator of Italian rye-grass, and, though he had never obtained such results as Mr. Morton adduced, he had carried on the cultivation with considerable advantage to himself, his mode of proceeding being one which any other farmer might adopt. He sowed for pasture four gallons of Italian rye-grass seed, with 8lbs. of white clover, and 6lbs. of trefoil; for cuttings 2 gallons of the grass-seed, with 14lbs. of red clover. His crops had been very great; indeed, he had no hesitation in saying that in the last spring the crops saved his ewes and lambs. His farm was in Surrey, and he had substituted Italian rye-grass for rye, which was grown in that county. Italian rye-grass came in as food for the ewes and lambs equally early with rye. He had never seen it grown in this country with the aid of irrigation; but when grown simply either with white or red clover, it produced a very good crop. As success very greatly depended on the quality of the seed, he was exceedingly careful whence he obtained it, generally resorting for it to Mr. Parkinson, of Ley Fields, who had deservedly a great reputation for his seed. He had seen Italian rye-grass in Nottinghamshire ankle-deep in February; and he himself had some of that depth in March last year.

Mr. **Williams** said that many years ago, unfortunately for himself, he obtained a very bad description of seed; and the result was such that he became prejudiced against the cultivation of Italian rye-grass, and never cultivated it again until last autumn. A better kind of seed had recently been introduced into Wiltshire. It had there become the practice to sow it; and his prejudice against it having been removed by observation and experience, he was that year growing 80 acres of Italian rye-grass himself.

The **Chairman** wished to make two or three observations before this discussion was concluded. He had, in reference to this interesting subject, been placed in a somewhat similar position to that of the last speaker. A few years ago he got some Italian rye-grass seed from a neighbouring seedsman, and the result was that he was quite disgusted with the whole affair. By chance, a year or two afterwards he obtained a better description of seed; and he was happy to state that he was now exceedingly satisfied with the result—a result which was obtained without irrigation. He had seen quite enough of Italian rye-grass to convince him that, even without the advantage of irrigation, it was a very superior and an extremely useful plant: with irrigation its value was, no doubt, greatly enhanced. It was satisfactory to him to find that on a subject so important in relation to agriculture the general tendency of the discussion was to corroborate the views put forth by Mr. Morton; and that, though there was some difference as to quantity, there was none as to the advantage of cultivating Italian rye-grass.

Mr. **Denton** would be glad if Mr. Morton would state whether he thought Italian rye-grass was or was not exhausting to the land. In his opinion it was so; but he confessed that his experience with regard to its cultivation was small. It appeared to him, too, that when 75 per cent. of a crop was water or waste, it was very questionable whether its cultivation could be really economical.

Mr. J. C. **Nesbit** thought Mr. Denton's first objection might be disposed of in one or two words. Under the old system of agriculture, it being impossible that any farm could produce sufficient manure for its own wants, there no doubt was such a thing as an exhausting crop; at present, seeing that any quantity of manure could be imported from extraneous sources, there was no such thing as an exhausting crop; the term had no longer any application. With respect to the amount of water in Italian rye-grass, it had been proved by analysis that there was quite as much nutrition in a crop of that kind as in any of the root crops.

Mr. **Mechi** observed that there was 75 per cent. of water in a rump steak.

Mr. **Morton** said, in reply to Mr. Denton's question whether he considered Italian rye-grass exhausting, he had simply to say that no doubt a crop of double the size of another would take more out of the land; but, notwithstanding that, it would, he apprehended, be always preferred. (Hear, hear.) Any immediate exhausting effect produced on the land was compensated for by the circumstance that all that was fed off the land returned to the farm. In reference to the farm generally, whatever might be said of a particular portion of it, increased produce could not be a disadvantage. As to the extraordinary succulence of Italian rye-grass, that was a mere question of the age of the plant. Three tons of full grown grass was all that was requisite to make a ton of hay. It would be a mistake to suppose that these crops were produced in Italy solely by irrigation, large quantities of artificial manure being applied in Lombardy.

On the motion of Mr. Mechi, seconded by Mr. Trethewy, it was resolved—

"That it is the opinion of this Club, that on most farms a portion of land sown with Italian rye-grass, especially if irrigated in the manner of the Ayrshire farms, to which their attention has been directed, would in many ways be very advantageous to the farmers, from the great amount of the produce, and the easy and cheap mode of obtaining it."

The meeting terminated with the usual votes of thanks to the Chairman, and the introducer of the subject.

NATURE'S LAW OF MANURING.

Sir,—Permit me to address your readers once more, because I am certain that if all the manure of the farm was converted into liquid, and used in that state instead of the solid, it would lead to the impoverishment of the land; and in a few years the earth would not produce the same quantity of corn as at the present time. If all the manure of the farm was converted into liquid, and equally spread over it, such liquid would be absorbed by the earth. It would not become solid, and even if it should, it would only be in the shape of salts, which would again become soluble when rain came, and especially in wet seasons or when rain fell in excess, or in a continuation of such (and of late years we have had seasons of dry and wet weather, or courses) would re-dissolve the greater part of any consolidated matter of the liquid manure, carry it into the drains and ditches, and by them into the rivers. Such being the case, and I cannot conceive that it would not, it would waste the manure of the land, inasmuch as our sewage from towns is wasted by being poured into rivers. Mr. Mechi talks (as I have read in your valuable journal) of supplying the land with such quantities of liquid manure until it runs away coloured from the drain pipes. Is there no waste of manure in this operation? Is it not wasting manure as the sewage of towns is wasted? If it is not, I do not know what waste means. Also, it would be impossible for all farmers to purchase cattle and corn to the same extent as Mr. Mechi. In his balance-sheet he puts down, live stock bought, £1,619; corn cake for feeding purposes, £1,021 10s. 9d. If every man farming 170 acres of land, as he does, were to purchase cattle and corn at the same rate, where would the cattle and corn come from; and what would be the enhanced value of such, if every farm of 170 acres required such? The thing is preposterous; and this for the sake of manufacturing liquid manure, without any profit on the feeding, as he admits. Neither could you pipe the whole of Great Britain with iron tubes, for the carrying of liquid manure. What would be the enhanced value of iron, labour, &c.? Where would you find the money? It is all very well on a small scale as at Tiptree Hall, but not applicable to the extent advocated. And very soon the farmers could only apply, if all were to carry it out, the liquid manure made from the produce grown on their own farm; and if distributed as advocated, it could receive it only in homœopathic doses, and you would then see the evanescent effects of liquid manure. Look at the gravels sand, and chalk land, in farming phrase, how soon they eat up solid manure. How much sooner would liquid manure be re-dissolved and percolate to the substratum when rain to any extent fell, and the land become impoverished, if the farmer had no other resource than that supplied by his own farm! and if all adopted such a method, it must soon come to that. Where I give praise to Mr. Mechi is, his trying to secure the use of town sewage—trying to prevent its waste; a mine of wealth, said 25 years ago to be worth 15s. per individual, and that of London of the value of £2,000,000 a-year. All praise to Mr. Mechi for adopting the use of iron pipes for town sewage as on his farm, that being the right method, and the public should be grateful for his experiment of such, but in the end would not be grateful for advising the whole of farm manure being converted into liquid. As I showed in my previous letter, nature manures by the slower and permanent decay of its own materials, husbanding its resources, so that there is no waste; and we cannot break that law without injury to the land. Last season was no test of the liquid manure system, because I could point out farms in Gloucestershire and Surrey where 8 qrs. of wheat were grown per acre under good farming, without the use of liquid manure, and 15 qrs. of oats, and on land the rental of which was about 25s. per acre; and as an experienced farmer remarked, who farmed 500 acres, "Here," said he, "is a piece of land drained with tiles 4 ft. deep, and manured; there beside it is a piece not drained nor manured, yet through the effect of the season the neglected portion had the best crop."

There are three things necessary for vegetation—heat, air, and moisture; deprive it of either of those, and vegetation ceases. How much then will always depend on nature, because we can have the control of those three requisites only to a limited extent: follow nature as your guide, and you will never do wrong. I could detail some admirable results of growing the same crop for years in succession by returning its own straw to the land it came off, with a slight addition of other manure to make up for the deficiency of the corn sold, far surpassing the Blois Weedon experiment in yield, and which some day I may publish. It is only nature's operation which never errs. I am no disparager of improving the system of agriculture by drainage and the use of town sewage, returning all to the land that came off; but I do disparage the converting all the farm manure into liquid, to be eventually wasted and carried off by rain, as town sewage is at this moment. It is breaking the great law by which nature replenishes the earth, and would be attended with the most baneful results, without you had the command of liquid manure *ad libitum*; and then land is often in a state when it has already had too much moisture: besides on the plastic clays it would make the land impervious to air. A few years ago I visited a farm in Surrey, highly manured with guano; the greater part of the straw was sold off for the London market, yet this farm was for a few years kept in a high state of cultivation, and yielded abundant crops. My observation was, "You will soon exhaust all the organic substance of the soil; you then will see what your crops will be, and what food there is left for plants." As I said, so it was; the guano not being sufficient for the food of plants, the crops became smaller, and the person was obliged again to have recourse to solid manure, in other words adopting nature's method of manuring; and he is fully convinced, from trial, that the soil should be filled as much as possible by organic matter. What constitutes our best soils? Those fullest of organic matter. How would you imitate them? By filling them as much as lay in my power by fibrous matter, such as the roots of plants, straw, and any other organic matter. Mr. Mechi says, "Observe in the cutting of railways how thin the surface staple of the land is! Only six inches or so! But," says he, "the system of liquid manure would increase the depth." I deny it, without applying for years in a much thicker state than he applies it, so that it could leave a sediment. Liquid manure might stain the soil deeper, and it would soon be washed out again by the rain; but as for making soil deeper in staple, it is not very probable. Those few inches of soil which he speaks of, is the decayed matter in part of former vegetation, which it behoves us to imitate, but which cannot be done by converting the manure of the farm into liquid. It has taken many years to form such staple by the gradual decay of former vegetable matter; and is a very slow process, but would be slower by the liquid method. I know that on many farms the liquid manure is wasted; by all means prevent such. It is only man that wastes, nature never! But she would do so, if she converted her solid manure into liquid. It is the universality of such as recommended by Mr. Mechi which I condemn. I do not think Mr. Mechi allows sufficient capital for piping the land with iron tubes. I have used the waste liquid manure for years when in farming, never suffering any to go to waste, or be lost. I used iron pipes to carry it to a tank, and found that the pipes very soon became corroded and eaten in holes, from the chemical action of the liquid, whereas some carrying pure water where not the least affected. Neither could Mr. Wilkins's system of carrying liquid manure, as practised near Reading, and applied under the soil, be carried out on a large scale; the expense would counterbalance any proceeds from the sale of the produce; the leakage and liability to get out of order would be very great; besides the expense of removing the land to form the bed or pan would be too great ever to be used on a large scale. Many such experiments no doubt are valuable, and all praise should be given to those who experiment; but I am convinced that to depart so much from nature's laws for the growth of vegetables on an extended scale, would lead to disappointment and baneful results.

I am, Mr. Editor,
Yours, obediently, J. SWAN.

Acton, Feb. 27th, 1855.

AGRICULTURAL CHEMISTRY AND MECHANICS.

In a former article on this subject we glanced at the importance to agriculture of that branch of Government entrusted with the control of letters patent; and in the present have to review, as there promised, the work of reformation in it now in progress, so far as the chemical and mechanical ingenuity of the past and present is being brought to the assistance of the farmer. In the former, our observations were necessarily more confined to the interest of the patentee than that of the public, his labours in surmounting the many obstacles in the way of successful agriculture taking precedence, like the labours of seedtime to the reaping of abundant crops in harvest. In other words, every patent in agricultural chemistry and mechanics which passes the Great Seal Office, being a step made in advance in one or other or both of these sciences, is calculated to overcome the stubborn circumstances of the soil, conferring important advantages upon the landed interest, which advantages we now propose discussing.

The work of reformation in this department of her Majesty's Government will soon publish its own importance. In proof of this we have only to mention that to the farmer, the powerful arm of the law appears composedly determined not to stop until the huge Patent-Office incubus of antiquated times is fairly removed, and the science of agricultural chemistry and mechanics set free to enlighten and enrich the provinces. So great is the difference between the working of the past and present patent laws as almost to be beyond comparison; for the former placed both of those sciences under a bushel, while the latter is already disseminating their light so as to enlighten the agricultural body. In other words, under the old statute, "specifications," "disclaimers," and "memoranda of alterations," were enrolled or deposited in various Government offices; such as the Rolls' Chapel, Petty Bag, Enrolment Office, Court of Chancery, or in the custody of the Master of the Rolls, as Keeper of the Public Records, &c., &c., where they were safely placed beyond the reach of almost all, save patent agents; and even they themselves, unless where a record of their own was kept, may often "as well have sought a needle in a haystack" as the specification of many a patent. Strange as it may appear, yet such is fact, that although the patentee was taken bound to make known his proposition for the benefit of the public, and to reduce it to practice, yet the science of every project was kept separate from its own practice!—the public receiving the latter, *but the law the former, hiding it in a napkin, like the unprofitable servant.* On the contrary, specifications under the present statute are printed and published; so that the progress now being made in the science and practice of agricultural chemistry and mechanics will be duly laid before the agricultural public through the instrumentality of her Majesty's Patent Office, with the joint co-operation of the agricultural press. The *Mark Lane Express,* for instance, will now have weekly to review the different specifications connected with those sciences, when printed, so as to enable its readers to procure copies of them from the Patent Office, and keep pace itself with the progress of those sciences.

A reformation so propitious as this is deserving of a more detailed notice; and in order to do so, observing brevity at the same time, we shall *first* glance at the Patent Office machinery for publishing specifications; *second,* the invaluable information which these convey to the public, more especially the agricultural interest; and *lastly*, the propriety of the press and patentees, with their agents, co-operating with the Patent Office in bringing specifications before the public.

1. The reading room which was opened last Monday in connexion with the Patent Office, will afford the correspondents of the metropolitan press the privilege of examining the whole of its records free of charge, and extracting therefrom the progress of chemical and mechanical science for their respective columns—and not only correspondents of the press, but the public generally. The thirtieth section of the statute (15 & 16 Vict., c. 83) authorises "the Commissioners to present copies of all such publications to such public libraries and museums as they may think fit;" so that in all our principal towns a copy should be presented to some library or museum in it, for the benefit of the local press and the provinces. Until such are instituted, local papers may quote from the columns of the metropolitan press; but the sooner they have access directly to the publications of the Patent Office so much the better; and we have no doubt, from the lively interest our commercial and manufacturing towns take in the progress of science, that much time will not be lost in securing such an invaluable public benefit.

The publications of the Patent Office comprise much more than the printed specifications, disclaimers, memoranda of alterations, and indices since 1852 till the date of the above statute; for there are standard works of reference besides these, such as "The Chronological Index of Patents," granted under the act of James I., from March, 1617, including all those which were commenced before the 1st October, 1852, two large volumes; "A Subject-matter Index of Patents" for the same period, two large volumes; "An Alphabetical Index of Patentees" for the same period also, one large volume; "A Reference Index of Patents," pointing out the office in which each enrolled specification may be consulted, the books in which such specifications, law proceedings, &c., have been noticed, also such of the specifications of patents granted under the Act of 21 James I. as have been published by the authority of the commissioners—one very large volume. Then we have a volume on reaping machines, English and foreign, from the earliest period on record up to 1853; and a series of specifications and drawings of fire-arms, projectiles, &c., &c., from 15th of May 1718 to 31st December 1853—nine large volumes. These—with the chronological, alphabetical, and subject-matter indices, specifications, drawings, &c., since 1852, and works to which reference is made—form a pretty compact library to the reading-room of the Patent Office, and would form a most important acquisition to all our public libraries and museums in our large provincial towns.

How far the Commissioners of Patents have discharged the duty of their high office in terms of the above section of the statute, in reference to other towns in the kingdom, we are not prepared to say. It is only very recently that the early indices just individualized were published. In getting them up they involve an amount of labour unprecedented even by Cruden's Concordance of the Holy Scriptures or Dr. Johnson's Dictionary of the English Language, and will remain a testimony to the indefatigable industry and perseverance of Bennet Woodcroft, Esq., so long as England has a Patent Office to contain them; but, whatever they have done, one thing is manifest, viz., that it is the duty no less than the interest of every public librarian in the kingdom, including our flourishing colonies, to look after so invaluable an acquisition to their stock of scientific literature as here devolves upon them, in procuring the works of the Patent Office, publishing the progress of chemical and mechanical science (and not only their present progress, but their past also, what has lain for centuries under the bushel of Patent Office mismanagement); and we hope no one thus situated will neglect to do so, sacrificing a trust so sacred.

2. The benefits which the Agricultural Interest will receive from being able to obtain printed copies of specifications, disclaimers and memoranda of alterations of chemical and mechanical patents, in connection with their profession, are both of a direct and indirect nature. Directly, for instance, specifications of patent manures, preparations for steeping or pickling seeds, washing sheep, curing foot-rot, or any other malady, will inform farmers of what they are composed, so that they can judge of their efficacy before they purchase, and what they should cost; and indirectly they would thus save themselves from a vast amount of imposition and quackery, to which they were subject under the old system, when specifications were lost in the mazy labyrinths of Chancery-lane and Lincoln's-inn. In mechanical specifications, again, they will be able to distinguish the difference between one patent machine and another, and which is likely to suit them the best, purchasing the most improved, and avoiding the incalculable loss sustained by working with antiquated things. Or sometimes, it may be, when they see what patentees claim in their specifications, they will only recognise what has been in practice from time immemorial in some secluded district or isolated case, and be able to act accordingly.

In further illustration of this proposition, we shall quote two examples lately investigated by us—the first a chemical patent, and the other a mechanical one. And we may just remark that in doing so, we make the selection just because the specifications of both are lying before us at present.

The chemical patent is one of some promise; but the plan the patentee proposes working it is the reverse, while his charges are exorbitant, and will be the ruin of a valuable discovery in science, at least to himself. The chemical agent he patents is a natural product which we have been in the habit of buying and using for the last thirty years, but not for the express purpose to which the patentee applies it, consequently he cannot prevent us buying it as usual, which we can do at present at £12 per ton, being £2 per ton more than when we last bought; moreover, an inferior sort, good enough for the purposes to which the patentee applies it, can be had at something like half the money; but we cannot use it according to his proposition without a *licence.* But instead of the patentee granting a licence to use this chemical agent, he is grasping at the monopoly of its commerce contrary to law, charging farmers £280 per ton! Of this sum, about £112 per ton goes to the trade as their share of this money-making speculation, leaving £158 per ton as his own profit.

Let us now introduce our readers to her Majesty's Patent-office, where under the old patent laws there would have been no alternative, we presume, but to pay this £280 per ton to the patentee and the trade for this wonder-working and unknown chemical, but where under the present patent laws we procured the patentee's specification for *twopence-halfpenny*, which disclosed the secret (an article of which we have a stock on hand at the above price) and let us then ask how we are to proceed—use our own at £10, or the patentee's at £280? The £112 is no doubt an effectual bait to a large portion of the trade for the future! Still we can yet procure an unlimited supply at £12, with the information that an increase of consumption will rather reduce than increase the price.

The question is a practical one, and we shall endeavour to give it a practical answer. We are ready to give the patentee a penny per acre over what we farm as a licence for 14 years to use his patent—this being the legitimate mode of procedure; and if every farmer gives him as much, his fortune will soon be made. But before we will countenance such a gross commercial imposition upon the public, which justly boasts of its commercial integrity, or before we give £280 for an inferior article over whose commerce no patent can extend, we shall try two or three chemical shifts with our £10 stock of superior quality on hand. Had the patentee charged only £20 for the best quality, we could not have done so, as the expense would have exceeded a hundred per cent. of the prime cost of the article; but £270 make a broad margin to work upon, and neither the patentee nor patent-laws can blame us for making the best use of it possible.

The mechanical patent which we give is an improvement, or rather an auxiliary part to machines already in use, possessing no ordinary merit. At first the patentee aimed at the monopoly of the manufacture of the part; but here he miscalculated the force of circumstances—"turning a deaf ear" to anything told him to the contrary. But he now sees the soundness of our remarks, that he who manufactures the machine must also manufacture the part, and is preparing to place the mechanical working of his patent into the hands of our great implement makers accordingly. In this case a large drawing, 20 inches by 28, accompanies the specification, both costing *only ninepence*, and would enable any farmer or implement maker not only to judge of its merits, but arrive at the above conclusion as to the claims of the patent, and the best plan of carrying it out for the mutual interest of farmers, implement makers, and patentee.

On this head, therefore, we conclude that no farmer, after this, ought to purchase any patented article whatever under the present statute, until he has first purchased the patentees' specification of it. In other words, the latter is the science of the *former*, and therefore the two ought always to go together. As the knowledge of agricultural chemistry and mechanics becomes more general among them, we have no doubt but this rule will be universally followed; and that it should be so already is manifest, from the examples we have given, more especially the chemical one. Mechanical propositions carry their own evidence of merit upon their surface, while experiments are easily and satisfactorily made; but it is otherwise in chemistry, from the complicated nature and diversity of circumstances involved, imperceptible to the eye.

3. Our third proposition involves the question of farmers getting specifications of patents. That they would give twopence-halfpenny to know, before purchasing, what this or that patent manure or other article was made of, which is probably the average price of the specifications of chemical patents, is, we think, no more than reasonable to suppose; and as the average price of mechanical specifications will be under a shilling, many of them would give this small sum also to procure the only authorised version of the science of their new implement. Consequently, through what channel are they to get these invaluable cheap publications of the Patent Office? It is usual for booksellers to advertise, charging a long price to cover expenses and profit; but the Patent Office only sells to accommodate the public, few of whom interested in the progress of agricultural chemistry and mechanics see the *London Gazette* or *Patent Office Journal*, in which its publications appear. How are they to ascertain the progress which those two sciences are making?

Several plans might be adopted to secure this; two or three of which we shall briefly describe. *First*, it is obviously the duty and interest of the agricultural press to keep pace with the progress of the above sciences, and therefore to review weekly the different specifications of new patents as they are printed and published; and in doing so, the number, date, title, and price could be stated so as to enable readers to remit the amount in postage-stamps to the Patent-office, which promises to forward the specifications to order without delay. *Second*, patentees or their agents could state the above in their advertisements; or *third*, purchasers could demand of the vendors of patent articles a copy of the patentee's specifications before purchasing. Any of these plans would answer; and if farmers were to make a practice of not purchasing until they were in possession of specifications, vendors would generally adopt the second—not only in their advertisements in the columns of the agricultural press, but also in their handbills and catalogues, and *we may just give a timely hint that the sooner they adopt the practice, the sooner they will consult their own interest.* Their doing so, however, would not relieve the agricultural press from the obligation of one notice of every specification or step made in the progress of chemical and mechanical science; but one such notice, however valuable to vendors, may not be sufficient to arrest the attention of some farmers.

In discharging this duty the agricultural press would obviously be serving the interest of both the Patent-office and patentee, and therefore would be entitled to a gratuitous copy of specifications; and we hope the 30th section of the statute is broad enough to cover this demand or rather debt of the Patent-office itself.

Such is the important work of reformation now in progress in Her Majesty's Patent-office. We could have said much more in its favour; but we hope what has been elicited involves something more lasting than mere laudation. There is no other branch of industry so dependent upon chemical and mechanical science as agriculture, and therefore none more interested in its progress. Landlords are equally interested here with their tenants; and both must perceive, from what we have said, that the publications of the Patent-office are deserving of a timely perusal.

ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

A WEEKLY COUNCIL was held on Wednesday, the 28th of February. Present: Mr. MILES, M.P., President, in the chair; Sir John V. B. Johnstone, Bart., M.P.; Mr. Raymond Barker; Mr. Hodgson Barrow, M.P.; Mr. Bethell; Dr. Calvert; Mr. Corbet; Mr. Edward David; Mr. Dent, M.P.; Mr. H. Devas; Rev. L. Vernon Harcourt; Mr. Majendie; Mr. Paine; Mr. Pocock; Mr. Scott; Mr. Slaney; and Professor Way.

SHEDDING.—Mr. Jonathan Gray's model of an economical mode of constructing shedding for agricultural and other purposes was submitted to the Council; and, in the absence of the inventor (through illness), was explained to the members by the President. The framework consisted of rows of upright posts, formed of barked larch poles, let into holes in the ground made by an auger, and held securely in their upright position by longitudinal and transverse metallic wires, ropes, or rods passing over their tops, and carried, like the chains of a suspension-bridge, on each side into the ground, where they were firmly moored and kept at their full stretch. The canvas sheets, by which the frame-work was covered, were secured in their position on each side of the shedding by elastic holders, which accommodated themselves to the varying strain and dimensions of the canvas, keeping it constantly at even tension. Though intended in the first instance only for agricultural purposes, especially as a convenient awning for the exhibition of live-stock and implements at agricultural societies, the principle of arrangement proposed by Mr. Gray would be equally applicable to the construction of tents, field hospitals, or other portable and temporary coverings for out-door purposes. The President also explained to the members the ingenious minor contrivances adopted by the inventor, in the details of his plan, for rendering his arrangements complete.—The thanks of the Council were ordered to Mr. Gray, for the trouble he had taken in submitting his invention to the notice of the Council.

AUSTRALIAN WHEAT.—The South Australian Local Committee for the Great Exhibition of 1851 transmitted to the Council a portion of their sample bottles of Adelaide grain received back from the Royal Commissioners at the close of the Exhibition. Sir Matthew White Ridley, Bart., informed the Council, in a letter addressed to them in August last, that although the Australian seed-Wheat had not succeeded well with some of the members who had tried it, he was himself partial to it as a Wheat after Turnips in his district in Northumberland. He had previously had good crops of it and a good sample; and had that year (1854) again a superb crop of it, from the produce of the small quantity he had received at a Council Meeting six or seven years ago. He had of course changed the land on which he had grown this particular Wheat.

STOPPAGE OF DRAINS.—Mr. Frere, of Roydon Hall, Diss, Norfolk, having frequently had his improvements checked by the stoppage of drains on his property, occasioned by fibres from the roots of trees, had recently met with a plan which appeared to him as likely to prove a radical cure of the evil in question. It was contained in Mr. Brown's second edition of his work entitled "The Forester," in pages 132—4. Mr. Frere had adopted the plan proposed, to a small extent, as an experiment, the result of which he would in due course report to the Council. In the meantime, he thought that some other members of the Society might possibly be induced to join him in the trial during the ensuing spring. He suggested that Mr. Brown would, perhaps, on application to him, kindly supply the result of his own experience of the plan he had proposed, during the four years that had elapsed since the second edition of his work had appeared. Mr. Brown's shut-drain among trees is 48 inches deep, 12 wide at the top, and 9 at the bottom. In filling the drain, he recommends rough gravel to be put in for the first 8 inches from the bottom, on which bed of gravel a sole of slates is to be laid for the drain tiles to rest upon, leaving between each sole a vacancy, or chamber, 1 inch deep. The tiles being laid, are to be surrounded with a puddle of good clay 3 inches thick on each side, and over the top. This covering of clay, he conceives, will prevent the fibres descending into the tiles, while the current of water filtering through the gravel will induce them to remain below them, the chamber between the soles being intended to receive any superabundant water the bed of gravel might on any extraordinary flow be unable to contain. Mr. Brown considers that such a drain would keep good for 50 years.—Sir John Johnstone feared that such drains would be double the expense of those constructed in the ordinary way.—Mr. Paine had been in the habit of using double tiles for the purpose proposed, and these were found fully to answer the purpose.

COCK'S-FOOT GRASS.—Communications on the value of the *Dactylis glomerata* were received from Miss Banister, of Steyning, Mr. Graburn, and Mr. Scott. Miss Banister's paper referred to her own experience in the cultivation of that Grass, and to the various specimens she had forwarded from time to time to the Council; Mr. Graburn's, to his comparison of the Cock's-foot with the Italian Rye-grass, for forcing purposes, and to a regular series of experiments on the productive powers of various Grasses by means of irrigation, in which he was about to engage, and of which he would furnish to the Council the detailed result; Mr. Scott's, to information on the value of the Dactylis glomerata, given by Mr. Fulton in his prize essay in the Highland Society's Transactions for October, 1853, and to Mr. Lawson's work on Grasses.—Dr. Calvert remarked that the Cock's-foot Grass took the lead of the other Grasses after mowing until the frost set in, when it was destroyed. He preferred the Tall Fescue (Festuca elatior), which came in earlier and continued later, being at the same time ravenously preferred to all other Grasses by the cattle and horses. He was sorry that the Fescue in question had not been one of the Grasses examined by Prof. Way in his valuable paper in the Journal. A full account of its merits would be found in Sinclair's well known work.—Prof. Way's specimens had been supplied to him by Mr. Bravender, of Gloucestershire, who considered the Cock's-foot as one of those Grasses that indicated good land; and it had been found by Prof. Way's analysis to stand at the head of the list of the grasses supposed to be nutritious, chemically speaking, Professor Way not having ascertained practically how far its flesh-forming constituents were free or controlled by other circumstances in the actual feeding of animals.—Sir John Johnstone thought the Cock's-foot very good as a bite for the second year. Much of its value depended on its cultivation, the grass being coarse under those circumstances in which its management was neglected.—Dr. Calvert had devoted a lengthened period to the selection and cultivation of the different grasses, and he hoped in a few weeks to be able to draw up for the Society a report of his results.

ANALYSIS OF MANURES. — Mr. Bethell having called the attention of the Council to the necessity of the Society's publishing a table showing the proportion of nitrogen and ammonia, and of the phosphates and alkalies in the different substances, whether natural or artificial, used as manures, the President, Professor Way, Mr. Slaney, Sir John Johnstone, Mr. Paine, the Rev. L. Vernon Harcourt, and Mr. Raymond Barker, addressed the Council on the importance of the data which such a table would furnish to the farmers of the country, in their estimation of the market value of a manure, and of its adaptation to their particular soils; and the Council referred the recommendation to the Chemical Committee of the Society.—The Council having referred a paper by Mr. Templeton, on Turnip Feeding, to the Journal Committee, they adjourned to their monthly meeting on the 7th of March.

A MONTHLY COUNCIL was held on the 7th of March: present, Mr. MILES, M.P., President (in the Chair), Lord Berners, Sir John V. Shelley, Bt., M.P., Sir Charles Lemon, Bt., M.P., Sir John V. B. Johnstone, Bt., M.P., Sir Archibald K. Macdonald, Bt., Mr. Raymond Barker, Mr. Barnett, Mr. Hodgson Barrow, M.P., Mr. Barthropp, Mr. Cavendish, Colonel Challoner, Mr. Gadesden, Mr. Garrett, Mr. Hamond, Mr. Fisher Hobbs, Mr. Hoskyns, Mr. Jonas, Mr. Kinder, Mr. Lawes, Mr. Paine, Professor Simonds, Mr. Simpson, Mr. Thompson, Professor Way, Mr. Jonas Webb, and Mr. Woodward.

Edward Warner, Esq., M.P., of Higham Hall, near Woodford, Essex, was elected a Governor of the Society.

The following new members were elected:—

Adney, John, Rowton, Wellington, Salop
Allnut, Henry, College Green, Dublin
Aylmer, Hugh, West Dereham, Norfolk
Bethell, Slingsby, Hackwood Park, Basingstoke
Bowstead, William, Hackthorpe Hall, Penrith, Cumberland
Cowen, Robert, Carlisle
Ellis, John, Artington, Guildford, Surrey
Farthing, Walter, Stowey Court, Bridgewater, Somerset
Gisburne, Thomas Matthew, Walton Hall, Burton-on-Trent
Goodhart, Charles Emanuel, Langley, Beckenham, Kent
Goold, R. W., 20, Cockspur-street, Westminster
Gray, Jonathan, Upper Finchley Road, St. John's Wood
Hartley, Milham, High House, Sandwith, Whitehaven
Heathfield, William Eames, 20, King-street, St. James's
Jefferson, Henry, Rothersyke, Whitehaven
Nottidge, Josias, Bocking Hall, Braintree, Essex
Parke, Charles Joseph, Henbury, Wimborne, Dorset
Sowdon, Arthur Robert, Woolthorpe, Hereford
Speakman, Thomas, Doddington Park, Nantwich, Cheshire
Talbot de Malahide, Lord, Malahide Castle, Dublin
Templeton, Andrew, Clandeboyne, Belfast
Thompson, William, Dyke House, Hartlepool, Durham
Thompson, Anthony, Cross, Whitehaven
Tallant, Francis, Bushey Grove Farm, Watford, Herts
Umfreville, S. C., Ingress Abbey, Greenhithe, Kent
Wren, John Hansell, Stockton-on-Tees, Durham
Walter, John, Upchurch, Sittingbourne, Kent
Walker, John, 25, Lonsdale Square, Islington
Winmill, S. P., Shopland, Rochford, Essex.

FINANCES.—Mr. Raymond Barker, Chairman of the Finance Committee, presented the monthly report on the accounts, from which it appeared that the current cash balance in the hands of the Bankers was £3,241. He also laid before the Council the report of the House Committee.

JOURNAL.—Sir John Johnstone presented the report of the Journal Committee, detailing the advanced progress made in the preparation of the ensuing July number, their recommendation of remuneration for surveys and researches connected with some of the papers, and their suggestion that the names of Sir Stafford Northcote and Mr. Dyke Acland should be added to the list of the committee.

AGRICULTURAL CHEMISTRY.—Sir John Johnstone also laid before the Council the report of the Chemical Committee, which embraced the following subjects:—

1. The rapid increase in the number of analyses made, at a reduced charge, in the laboratory of Professor Way, the consulting chemist to the Society, for its members, the number in the last year being more than double that in the preceding one; Professor Way remarking on this point, that the result was gratifying, both as an indication of the extending application of artificial manures, and as furnishing unmistakable evidence of the increased confidence of the agricultural public in the decisions of chemical analysis.
2. Prof. Way's statement that the high price and increased demand for guano, during the last year, had led to more than the usual amount of adulteration: also, that the use of superphosphate of lime was becoming year by year more general, and a greater amount of skill and capital devoted to its manufacture.
3. The progress made by Prof. Way in the examination of those conditions of soils, on which their peculiar management and adaptation for particular manures may eventually be found to depend.
4. Incidental investigations made by the consulting chemist: 1. Of samples of supposed specimens of Nitrate of Soda, and of Salts from the Nitre-beds of Mexico, along with instructions for recognising the alkaline Nitrates made for the Foreign Office; 2. Specimens of genuine Guano, and simple rules for testing the value of deposits, prepared at the request of the Admiralty, for the use of Naval Officers in their research for Guano; 3. Examination of Stothert's Manure, made at the request of Viscount Palmerston, for his information as Secretary of State for the Home Department; 4. Analysis of Poisonous Oil-cake, made at the request of the Council of the Society.
5. The direction of the committee to Prof. Way, that he would, as the consulting chemist of the Society, investigate the nature and effects of the atmosphere upon soils, with a view to the publication of a paper on that subject in the Journal, if approved by the Journal Committee; and that on Wednesday, the 18th of April next, at 12 o'clock, he would be prepared to deliver a lecture before the members in the Council-room of the Society, "On the recent researches on the composition of the atmosphere in relation to vegetation." Other lectures for the season will be announced, when their subjects and the arrangements for their delivery shall have been decided upon by the Committee.
6. The removal of Prof. Way's Laboratory from Holles-street, to 15 Welbeck-street, where greater facilities will be obtained for carrying out his operations as consulting chemist of the Society.
7. The Committee's consideration of Mr. Bethell's suggestion, referred to them by the Weekly Council, held on the 28th of February; and their request to Prof. Way that he would draw up, for publication in the Journal, a tabulated statement of the analyses of the different manures, both natural and artificial, having regard to the normal and average composition, and value of the ingredients, taking as a standard the analysis of guano, published in the Society's Journal, vol. x, p. 224.

Guano-Supply.—The President reported the continued reception, through Lord Wodehouse, of communications from the Foreign-office, on the extensive researches undertaken by direction of the Earl of Clarendon for deposits of guano and the nitrates.

Judges' Awards.—On the motion of Mr. Fisher Hobbs, the following resolution, of which Mr. Milward had given notice, was carried; namely—"That a Reserve-number be given by the Judges in each class of Live Stock."

Ages of Pigs.—On the motion of Mr. Fisher Hobbs, the following resolution, of which Mr. Brandreth Gibbs, had given notice, was carried (and a committee appointed accordingly), namely:—"That a special committee be appointed, to recommend some conditions in order to ensure the ages of pigs exhibited at the Society's Shows being correctly returned in the entries."

Essays and Reports received in competition for the Prizes of the Society in that department for the current year, were referred to the Journal Committee for adjudication.

His Excellency the Baron de Cetto presented a collection of works on the part of the Royal Bavarian Agricultural Society at Munich. The New York State Agricultural Society transmitted the last volume of their transactions. The Count de Gourcy presented his agricultural "Promenades," "Itinéraire," and "Voyage," in England, Central France, and other continental districts. M. B. Vicuna Mackenna sent his agricultural account of Chili. The Association for promoting Improvement in the Dwellings and Domestic Condition of Agricultural Labourers in Scotland presented copies of their first Annual Report. Prof. Simonds, on the part of himself and Prof. Morton, as joint editors of the new series of the "Veterinarian," laid copies of that work before the Council. Mr. Cuthbert Johnson transmitted a copy of his paper on the Application of Sewage to Agricultural Purposes.—The Council ordered their usual acknowledgments for these and other presents made to the Society.

Adjourned to Wednesday, March 14.

A Weekly Council was held on the 14th of March: present, Sir Robert Price, Bart., M.P., in the Chair, Lord Camoys, Sir Montague Cholmeley, Bart., Mr. B. Almack, Mr. Bethell, Mr. Caird, Dr. Calvert, Mr. Corbet, Mr. Devas, Mr. Grissell, Rev. L. V. Harcourt, Rev. C. T. James, Mr. Dyce Nicol, Mr. Pocock, Mr. Scott, Professor Simonds, and Professor Way.

Communications and Presents.—Mr. George Sainsbury complained of the annoyance to which the breeders of choice and valuable stock were subjected by the "trespass of neighbours' bulls" when turned out into adjoining pastures. Mr. Towers stated his opinion on the application of steam-power to the cultivation of land, adopting the views of Mr. Wren Hoskyns on the subject. Captain Kellermann's paper on the medicinal properties of the leaves of the Black Currant was received through the Foreign Office from Lord Cowley in Paris. Mr. John Howe suggested the destruction of rats by means of fumigation, on the principle adopted by Mr. Browne in his well-known apparatus for fumigating fruit and other trees. Mr. Bethell exhibited specimens, in a moist as well as dry state, of roots re-

duced to a pulp by machinery. The East India Company transmitted a further supply of Pine seeds, from the Himalayan and other districts of India. The Royal Hanoverian Agricultural Society presented a copy of their Transactions, for which the Council ordered the Journal of the Society to be forwarded in return. Prof. Wilson transmitted a collection of Illustrated Implement-Catalogues, from America.

The Council having ordered their usual acknowledgments for these communications and presents, adjourned over Wednesday, the 21st inst., to their weekly meeting on the 28th of March.

CUMBERED GROUND.

FIRST STROKES TOWARDS THE "CLEARING."

"My heart sank within me as I approached the spot that was to be my future residence. I beheld a vast cedar swamp! The soil looked rich and black; but the water stood in pools, and the trunks and branches of the cedars were leaning in all directions and at all angles, with their thick foliage and branches intermingled in wild confusion. The roots spread along the uneven surface of the ground so thickly that they seemed to form a vast network over the greater part of its surface. The task of clearing such a labyrinth seemed utterly hopeless."

So writes an emigrant of his first impression of the Canadian backwoods.

Pretty much the same language might my friend, Mr. S——, have employed as he contemplated the scene before him, where the rich elements of the human character lay so hopelessly beneath a tangled rank overgrowth, denuded both of light and air by that monster growth of vicious habits, whose gnarled roots ramified it in all directions, rendering the prospect of a clearing a mockery, the idea of cultivation well-nigh insanity.

In a district having been thus impregnated with the seeds of evil, and saturated with vice, for a long series of years, it seemed hopeless to think of effecting by a single will, however good, the desired change. And I cannot wonder that Mr. S—— stood for a while in blank amazement, without essaying once to try his strength against the obstacles that cumbered his ground.

But like Bonaparte, he had scouted the word *impossible* from his dictionary, and like another great man—Lord Mansfield, I think—he looked upon obstacles as "things to be overcome."

He was greatly perplexed as to the manner in which he should set about his work of reformation, and as he revolved plan after plan within his mind, he determined that the best way was to commence his work imperceptibly, unostentatiously; avoiding any course that might startle and arouse prejudice against his operations from the first. It was decided to set before his workpeople a calm, consistent example; an example that he hoped might *silently* condemn their habits of dissipation, and by a sensible contrast induce them to love goodness for its own sake, and might more than any other plan gain their respect, if not their affections, to himself.

Care for this respect and affection is, I know, commonly despised and disowned; but whether they own it or not, all men care to be well thought of. A man will frequently exhibit charity, because the incense of a published gratitude is a pleasurable odour to his pride. This, however, is a bad motive, and leads in time to bad results, and is altogether alien to that "good will unto men" which leads the philanthropist to forget himself in his desire to lift humanity from her degradation.

To conciliate them then, to make his way by acts of kindness to their hearts, there to root himself and grow up in their confidence, my friend, with all the ardour of a philanthropist, addressed himself. He spoke gently with the men about their failings; he showed them how their dissipated courses told against their own comfort; he evinced an interest in their families; he gave kindly counsel to young men, with a careful reference to the characters and circumstances of each. Nor, whilst he appeared to his labourers in the relation of *Friend*, did he for an instant lose the character of *Master*.

A few of the irreclaimables fled from a discipline that, by its very silence, was always convicting them; but over those who remained Mr. S—— obtained a marked influence and command, such as his blustering, swearing, or less conscientious neighbours sought for in vain. Supposing, to a gentleman who had abundant opportunities of observing what occurred upon his farm, that he got less work done perhaps than those farmers who assumed more of the task-master than he did, he received the following rejoinder: "Indeed, Mr. S——, but you are quite wrong. T'is my belief that you get more work done than any man in the district. A glance over the hedge will generally tell me whether my neighbours Mr. —— or Mr. —— are from home or not; but I never see any difference in your regular men; I never look but I see them at work." In fact, Mr. S. knew what work was—his men could rarely deceive him about either piece-work, or day-work; but this intimate acquaintance with business is not, my own experience teaches me to know, so common as it should be. Some masters, always suspicious, and expecting to be "done," approach their men with a growl, and leave them with a threat; others, from want of knowledge, award their praise or blame unjustly. But my friend exercised extreme care in the matter; his men observed that he was *conscientious* in the distribution of his approbation and his censure, so that the one and the other had their full weight with them.

After pursuing this system, which I own I have only imperfectly sketched out, for two years, and proved the policy of working thus silently and gradually upon the men and families around him, he thought the time had arrived when, having subdued all antagonism to rectitude and improvement, he might further develope his plans.

When the second harvest was all gathered in, my friend gave his people a half-holiday. Dinner was provided instead of supper. The men were invited to it, and their families came to tea; after which a little amusement with a magic lantern was introduced, and between times Mr. S. gave the following address—I say following address; but I can only give the substance of it, as it was related to me.

It was divided into several parts. Mr. S. exhibited first the relation in which the labourer stood to the employer. He spoke here of the nature of a bargain—of how it implied certain conditions and imposed certain responsibilities, in which the time and interests of the employer were to be rigidly respected. My friend described, secondly, the relation in which the men stood to themselves, their families, and their country. Under this head he enforced industry, sobriety, providence, the claims of religion; and the laws of kindness and mutual forbearance, as the nectar of domestic life. He expatiated upon the power of example to a rising family, and discovered the claims of that family to the careful nourishment, supervision, religious and secular training of the parents, &c.

He exhibited, thirdly, the relation in which the employer stood to the employed. He showed the laws that *do* regulate, and those which *should* regulate the remuneration of manual toil. He spoke of the pleasure he felt in recognising everyone who, with a manly and honest courage, was struggling through want and privation to maintain and bring up a family, as a fellow-worker with himself in the great field of the world, to whom, by the dispensation of Providence, he could now and again lend, when needed, a helping hand. He spoke of the duties attaching to property. He showed that, owing to the disproportion existing between the land and the population in this country, it was seldom possible that the remuneration of work should bear a just relation to its intrinsic value; and that society owed to the poor a debt, which, as it could not repay in full, it is bound to acknowledge with kindly sympathy, and the proffer of various assistance, in lieu. After giving a lucid explanation of the relations subsisting between capital and labour, he concluded thus—a conclusion which, as he related it to me, impressed itself forcibly upon my mind, and for this reason I can give it nearly *verbatim*.

"As I have stated, I feel under a kind of obligation to you. I am unable to reverse suddenly, and at once, or of myself, those laws of society that press with unjust weight upon you. To effect this change, your own improvement and the progress of opinion are necessary. But I can at least tender you the consolation and assistance of *a practical sympathy*. Be it mine to see to the comfort of your dwellings; to introduce you to a better system of religious instruction; to see to the reconstruction of the village school, on a foundation more befitting the character of our times, so that your children may be trained in such a way as to prove a blessing and a stay to you.

"I wish to encourage you to sobriety, by teaching you its pleasantness, and to prompt you to providence by making you prove to yourselves that 'money saved is money earned.' And seeing that there are amongst us men grown who cannot read, and lads who, for want of stimulus, have lost what they knew, I have determined to open an adult class, certain evenings a week, through the winter quarter, for the instruction of such. And, because with all work and no play, Jack is in danger of becoming a dull boy, I propose the formation of a cricket club, to play certain evenings of every week during the summer quarter.

"I simply state these my intentions now, because we are all together, and that you may take them home to think about them. We are upon this world for our mutual enjoyment and improvement. I feel with you, and I trust that my designs will not fail in giving you a measure of that happiness which we all covet as a birthright."

MAKING WAY.

So soon as the autumn had set in, my friend Mr. S—— began to make preparations for the adult class that was to be carried on in the winter evenings. His own kitchen was large enough for the purpose, or, with a few alterations, an old outhouse adjoining it might have been made available. But he thought it desirable to centralise the sphere of its operations as much as possible. The village of K—— was only about two miles distant, and some of his labourers resided there; and, as his desire was to extend the benefit of his philanthropic effort as far as he could, he overlooked the inconvenience of distance to himself, and cast about at once for a suitable place of assembly. To his great satisfaction, he soon discovered a room, fitted up with desks and forms. It was used by a woman who kept a dame-school during the day, and was at his service every evening of the week. This fortunate "find" was eagerly secured.

The first meeting was called by placards posted about in the neighbourhood. It must have been curious to have witnessed that small beginning. Truly a small beginning! There were but ten men to meet Mr. S——, and eight of these were his own labourers.

Now those generalizing philanthropists and political economists, who can never be induced to help on poor struggling humanity but at the head of some mighty organization which is to revolutionize and reform society in some sudden and impossible manner, would not have been seen in such a slow and unpromising movement. But my friend had long accustomed himself to contemplate a great national effect, not as the result of any corporate movement, or any universal legislative enactment, but as the result of a slow accumulative process, helped forward mainly by the growth and expansion of Christian philanthropy in our land, and at length completed into a whole by the simple apposition of parts done separately and independently.

Very well. My friend had faith; and this beginning, this body of ten men—numerically discouraging or not—was the basis of future operations. So the objects of the class were explained in simple and precise language. The pursuit of knowledge was likened to a search for water. It is hard and deep digging for water; but when the spring is once reached, the water rises up to meet the digger, and to reward his toil. And these preliminary difficulties were in no way concealed; on the other hand, they were brought prominently forward. Mr. S. particularly desired of any who might be of weak and irresolute purpose to withdraw at once; because unless stimulated by the most earnest desire for improvement, they could not benefit themselves, and must necessarily retard others. He showed them that his part in the work was small in comparison to their own. He could only, as it were, place the tools in their hands, and teach them their use; for the rest, each man must depend upon his own unaided and determined energy. The four hours a week spent in that room would stand them in little stead; it must be the quiet, persevering application at home, on the intervening evenings, that would advance them. Nothing that is worth the having is acquired with ease.

Directed by a desire to conserve the virtues of independence, and with a view to supply an additional interest in the adult school, Mr. S—— determined so to arrange matters as to give to the men the impression that they were the principal promoters of their own improvement. To this end he threw at once the whole management of the school into their hands. Upon proposing that a committee of management should be elected, Mr. S—— explained that as the work of this committee would be to decide upon the admission and exclusion of applicants for membership, the progress of the whole class depending very much upon the unity of its parts, it should be formed of such men as were best acquainted with the population, so that none might be brought in except such as were thoroughly in earnest.

This committee, consisting of five of the men then present, was accordingly elected; and they, assuming their official character at once, with a serio-comic air of new-fledged authority curious to see, as I learned from Mr. S——, proceeded to *ballot* upon their remaining companions, who, being well-known, were elected and admitted to membership that evening.

I may here say that this plan was found to work admirably. Members were proposed one week; and as upon investigation their motives for joining the class were found to be good or bad, so was the result when the ballot was taken upon the names the following week.

With the same design, to make the men the architects of their own institution, Mr. S—— subsequently submitted to their consideration and approval one of a series of rules, and in its changed or unchanged state, took the sense of the members upon it. Modified and accepted, they stood as follows:—

RULES

FOR THE WORKING MEN'S SCHOOL.

1st. That this room will be open every Monday and Thursday evening from 7 till 9 o'clock.

2nd. That any member five minutes behind the time will pay a forfeit of one penny; any member absent the whole evening will be required to pay a fine of twopence, except in case of illness; and any member absent two successive evenings, without being able to produce two witnesses from the class to certify his inability to attend, will have his name struck off the list.

3rd. That all money so paid in forfeits shall go to defray the expenses of lighting and warming this room.

4th. That every member shall come provided with a Bible, a large slate, and a pencil.

5th. That order must be strictly kept; to ensure which, talking cannot be allowed amongst the members during the hours of business.

6th. That the greatest attention must be paid to all the instruction given in this room, and that the lessons given to be prepared at home shall, without fail, be ready upon the next evening of assembly.

7th. That no one beneath the age of fifteen can be admitted.

Mr. S. humorously observed, at the conclusion of this part of the business, that "having enacted their own laws, they in honour must be the last persons expected to break them!" And as the rules were read over to every fresh member, and his assent to them obtained, they were all bound by the same responsibility to respect them.

I give the rules just as they are, simply because I think they may be useful to those who may be inclined to follow my friend's example without knowing exactly how to go about it. A question may be raised, perhaps, respecting the second regulation, as being too severe; but Mr. S. told me that it was to it he was mainly indebted for his speedy success. Nothing, in a case of this kind, can be done with an irregular attendance or without punctuality.

During the first session, and throughout all those fluctuations that always accompany such a work as this, my friend—save on one occasion—was always found in his place at the time of meeting; encouraging all by his cheerful temper and genuine good will. His patience with the dull was beyond all praise.

Upon consulting the register that was kept, it appeared that from ten the numbers rose to fifty, and then diminished to forty-two; that seven of these forty-two scholars were present, and in time, every one of the thirty-two evenings; that fourteen were absent four evenings; eleven, nine; six, twelve; and four, thirteen evenings.

The practical working of the school I must show upon a future occasion.

DROPPING THE SEED.

The swamp is gradually disappearing before the beneficent skill of civilization. Courage! perseverance! The work of felling, grubbing, burning, and draining completed, and the rich golden fruit of well-directed toil shall be seen waving in triumph over the howling waste. Hurrah! light breaks in to disturb the heavy masses of shade, and the bud of promise peeps forth timidly here and there, to assure the heart, and nerve the arm of the patient toiler.

Many are they who have received from their relatives or friends in the bush such a bit of cheerful intelligence. It was with some such prelude that my friend, Mr. S—— sent me the narrative of his labours in the village of K——; a narrative that I will now continue.

Good readers, try and picture the spacious old school-room, lit up by the candles, distributed at intervals, upon the two rows of desks that reach from end to end, together with the cheery blaze from a large fire. How snug and warm it all looks —a fact evidently appreciated by the sturdy intelligent faces that are animated thereby. The same thought seems to strike all those busy fellows plying hand and brain; but enter the room a little before seven o'clock, with Mr. S., and observe the bustling importance of the "Committee men" as they place the lights, coax the fire, arrange the seats, and prepare the large black board for its passive duties. The clock strikes, and to the minute the muster-roll is called, and the attendance registered; forfeits are then taken, and new members proposed or elected. Such preliminaries being speedily despatched, and those slate exercises looked over and corrected, that have employed the intervening evenings at home, the immediate business of the night begins.

The school now divides into two classes—the 1st reading class, consisting usually of three-fourths of the whole number; and the 2nd, therefore, of the remaining fourth. While the 1st class is reading, the second is writing upon slates, having a large copy upon the black board before mentioned; and Mr. S. finds time now and then, while listening to the reading, to move from one to another with advice, help, and encouragement.

Although, much against his better judgment, my friend, during the first winter, was obliged to use the Holy Scriptures as a reading book: he commenced the Old Testament History, and made considerable and very gratifying progress in it. Before parting for the night, the extent of the next evening's lesson was pointed out, and each member was expected to have read over several times at home the chapter or chapters alluded to. The use of this rule is obvious, from the number of questions as to the meaning of words, &c., which frequently meet Mr. S.—a laudable curiosity he takes care to cultivate. As the reading is going on, he explains every word that may appear to require it, and he furnishes a running comment upon the entire lesson. This may seem to be a slow process; but it is a sure one. A man wants to read, not with fluency, but with intelligence. My friend told me that he knew one man who could read any ordinary paragraph with as great facility as himself, and yet could not give a rational answer upon any one part of it. The wisdom of his slow, but successful, process was evident enough, when he came to interrogate the man on what they had read, at the close of the exercise: this he always did. At first there was a good deal of shyness and pride; but when this was overcome, the scene was quite an animating one, and the desire to be first with an answer made the men pore over and master the subject at home, with an assiduity they otherwise would not have employed.

Then comes the turn for class 2 to read, class 1 writing in the meantime. Just fancy a motley group—old men, some bent nearly double by age; others hale, but silver-headed; middle-aged men, and youths of fifteen: ten or twelve of them. Not one knows a letter. What would you do, good reader?

My friend hit upon a scheme of teaching them to read that succeeded admirably, but which in its execution required of him an extraordinary amount of *patience*. He very properly observed to me, when speaking upon this difficulty, "But I could not draw back. I had always been an advocate for reform, and here at once was my sincerity challenged. A sphere of work opened out before me, in which I could achieve more real good for the world than by any amount of platform declamation, than by any puppet-play of men, or any overweening attention to the Punch-and-Judyism of Statesmanship. Penetrate the dark masses of this people with the divine light of a vivifying truth—create with laborious endeavour a thinking and a reading public, and the superiority of our representative institutions shall then be upheld to the gaze of an admirant world. Very well, here was my duty. I could not perform the functions of schoolmaster to all England; but in this my allotted sphere I could work, and did work; hoping not only that the fire of my zeal might kindle the zeal of others around me, but hoping that I was not the only man in the country animated by a like purpose. Patient self-sacrifice—what is it, in comparison with the splendour of those results it may produce? Pursued to their final issues, are they not redemption from those curses of ignorance and vice, amid whose threatening billows the straining vessel of our State pitches and tosses, making difficult way, and sometimes no way, but rather retrograding?" "Yes," rejoined I; "but before we can sit down, and be satisfied with doing thoroughly and well what lies within the compass of our strength, there must be a conquest over the pride of our nature—a calling in of the fancy; we must resign the glory of devising a magnificent whole, and count it enough to have rendered, in our narrow sphere and in our little day, the contribution of a part to the good of human society." "Great moral or economical changes," says Dr. Chalmers, "are not the achievement of a single arm, but of many." To the universalists in science we stand not indebted for her present progress and elevation, *but to the separate labours of many, in distinct fields*. The glare of publicity may not follow the solitary worker, but the worth and efficacy of his labours will gain him many imitators.

Well, but to revert to this second class. Mr. S. printed a number of good-sized alphabets upon cardboard, and cut the letters out in squares. A certain number of them were tumbled out before each man, and to him fell the task of assorting all of a kind. This familiarized the eye with the distinctive characters of the letters. When this step was gained, Mr. S. printed a scripture text upon the black board, requiring each of them to arrange his letters in the same order on the desk before him; and, while this tedious process was going forward, he had time to attend to the writing of the first class. The letters being properly placed, he spelt the first word, and alternately each member of the class did the same. He then pronounced it, and was again followed by the men. When one word was conquered, another was in the same way acquired, until the whole verse was thus analyzed. The verse then passed round the class, each man pronouncing one word in succession, backwards and forwards, again and again, until they ceased to hesitate. Mr. S. then pronounced the whole passage, dwelling with distinct utterance upon every syllable, and the men in turn did likewise.

The verse chosen usually contained in it some maxim or moral sentiment, likely by its simplicity to attach itself to the minds and hearts of the readers. My friend mostly contrived to illustrate and enforce it under the guise of a few questions and remarks; and he expected them so to master it at home, as, on the next occasion to be able to read it with ease, and show that they understood it.

This process is tedious, but its results are pleasing in the extreme. The gratitude of the blind man recovered to sight is not more lively than that of some of these poor fellows to whom is thus given *the use of their faculties*.

I have now recorded the work of about an hour and ten minutes. I must speak of the latter engagements of the evening on another occasion.

F. R. S.

BURNET (POTERIUM SANGUISORBA of botany) is a native of Britain, growing on dry upland pastures and in calcareous soils. It was first introduced to the notice of the agriculturist by Mr. Rocque, of Waltham-green, in 1760. Since that time the numerous trials that have been made of it, as a plant for pasture and for hay, have not proved it equal to lucerne, clover, or sainfoin, except on soils where these plants do not succeed. The chief property that gives value to burnet is its handy nature, keeping green all winter, and also its early growth. If left uncut in autumn, it will afford green food from October till April. On soils agreeable to its growth a portion of ground set apart for the growth of burnet would therefore be attended with considerable profit: 64 drachms afford of nutritive matter 100 grains.

KENNINGTON AGRICULTURAL AND CHEMICAL COLLEGE.

LECTURES ON THE GENERAL PHENOMENA OF THE EARTH, HAVING REFERENCE TO THE PRODUCTION AND MAINTENANCE OF ORGANIC LIFE.

BY CHARLES JOHNSON, ESQ., PROFESSOR OF BOTANY, GUY'S HOSPITAL.

LECTURE III.

The movements of the ocean, described, in the concluding portion of our last lecture, as productive of a local effect of considerable importance to the inhabitants of western Europe, have, on a broad scale, fulfilled no trifling part in modifying the aspect of our rolling planet, and contributing to those conditions upon which the existence of organic being is dependent: in this view they must be regarded as having been coeval with the earliest deposit of that wide-spread mass of water upon its surface, and their continuity as uninterrupted, during the myriads of myriads of orbital revolutions by which the age of the earth prior to man's creation can alone be numbered. Beneath the light covering of soil in which terrestrial plants and trees vegetate, the level and undulating lands present a more or less loose material, in the form of gravel, sand, clay, &c., which, evidently resulting from the breaking up and distribution of previous masses by the force and flow of water, is termed *alluvium*. The term, from the Latin *alluo*, to wash, is in a geological acceptation usually confined in its signification, and refers to substances of comparatively recent accumulation, in opposition to those of greater relative antiquity: but an examination of the terrestrial crust to considerable depths shews us that the solid foundations over which this *alluvium* rests, were once in a similar loose state, and that they originated under the operation of the same laws, by which at present sand and shingle are heaped upon our sea-shores, rocks abraded by the dash of waves and torrents, and mud and silt deposited by inland floods—the sea, in some cases, having been the cause, and having left proofs of its action; while in others, the flow of fresh water is no less certainly indicated. Rocks of slate, sandstone, limestone, &c., thousands of feet in thickness—frequently containing the fossilised remains of animals and vegetables, of species long extinct, that inhabited the earth in periods so distant, that the mind, in reviewing these evidences of their transit, becomes bewildered in its efforts to trace the records of a past eternity—remain to shew us by their texture and composition, that the law of friction, the destroying and levelling process of the firm and vast in ever-changing nature, prevailed with equal force throughout the whole career of time elapsed, as it does at present; and that the momentum of the agitated fluid overcame then, as now, the atomic force of the most compact of solids. All of the stratified rocks are but consolidated sand and mud and pebble; and, whatever now may be their elevation, their material has been accumulated by subsidence in water, and its distribution more or less modified by its flow. The rocks reduced to fragment and to powder, their varied elements mingling with each other and with the wrecks of organic structure, have again become firm and fixed, again to undergo reiterated change, under the influence of the same agents by which their wear and overthrow was at first effected, and water is here all powerful. The ocean, always agitated—the rivers, with ceaseless currents hastening to pour their allotted tribute into its bosom, are mighty indeed in their operation, but the rain, the snow lightly falling, nay, even the gentlest dew, is not without its action on the hardest surface that receives it. The disintegration of the rock and the distribution of its particles are the earliest processes in the formation of soil, or in rendering the earth fitted to maintain organic life by the elaboration of the necessary elements contained in it, that are thus successively mingled and presented to the absorbent vessels of the plant in that state of minute division best suited for assimilation.

The abrading action of the sea, and the part that it has fulfilled in changing otherwise the character of the earth's habitable surface, are facts sufficiently illustrated by observation of present phenomena. The limits of existing lands are no more permanent than were those of the earlier geological eras; the water wears down and occupies *there*—*here* it throws up and retires. The question of alternate inundation and recession is one of time only, and though the duration of one human life may be too confined to witness both, the one may occur within its moiety: the garden in which the boy gathered flowers and sported with his playmates is now covered by the rolling waves, while the man is but a few years advancing beyond middle age. Let us take a hasty review of the conditions under which the ocean now operates to the production of such changes. No one who has witnessed the dashing of its angry billows, or even the gentle ripple with which in calmest mood it beats against the shore, could separate the idea of incessant wear resulting from incessant agitation; the effect of the latter, however, much depends upon the character of the coast and the declivity of the basin, more especially of that portion of the latter intervening between high and low water-mark, or perhaps extending some distance below the ebb. Regarding the subject upon a small scale, there might appear at first sight to be little regularity in its operation, but, generally speaking, it will be found consistent under all circumstances and in all situations. There will be observed a tendency to fill up bays and indentations, and to abridge projecting points and promontories. The elevation of a coast has but little to do with the change, except that the sea is longer in producing it upon a high than upon a low one: but it will be almost uniformly found, that where the shore is level or gently shelving, and the tides have much play—that is, where they retreat at low water very far from the land—there chiefly it is that the formation of the new boundary takes place with the greatest rapidity. The action of the tide, whether rising or falling, is nearly equal upon such a coast; it has a constant tendency rather to throw up than to carry down solid matter; and the waves, which advance more rapidly over a level or gently inclined plane than upon a steep shore, drive the sand, pebbles, sea-weeds, and other substances before them, and eventually deposit the accumulated masses immediately above the high water mark. As the drift becomes elevated by successive additions, it will, of course, follow that the sea, owing to its waters not rising above a certain mean height, has no power of throwing up more upon it; a second accumulation of similar materials must therefore take place at the foot of those first deposited, and thus in the sequel dry land is formed by degrees upon that which was originally the bottom of the sea. These lowlands, long after their formation, are liable to inundation by spring tides and during storms; but as each successive overflow probably deposits more solid matter upon them, and the sea is, owing to the same cause in which they originated, gradually removed farther off, they are at length placed beyond its reach, and become, in course of time varying according to circumstances, the fit abodes of animal and vegetable beings. Vast tracts of such land may be seen in all the stages of progress, between its recent escape from the sea and the highest grades of cultivation, on various parts of our own coasts, exhibiting by the character of the vegetation that covers it, the gradual transitions through which it has passed. Here, a mile or less inland, we see the waving corn, the clover and the sainfoin; a little nearer, the meadow and the pasture, where the dark but bright verdure of the grass betrays the marshy character of the soil beneath. As we advance this verdure gradually loses its brightness, and the slender wiry grasses that vegetate on poor and sandy ground, begin to predominate over the more grateful and nutritious herbage of the older meadow. These, in turn, become mingled with, and at length yield place to others, whose white or glaucous hue shows that they belong to saline situations, and are destined by Nature to flourish under an atmosphere laden with briny drops whenever the winds sweep inward from the neighbouring ocean. The newly-formed sandbank succeeds, at the foot of which shells and tangled sea-weed still accumulate, and prepare fresh conquests from their mother waters.

Where the shore is steep or precipitous, and the tide ebbs but a short distance, the drift is in smaller quantity, and probably in many cases does not collect at all, being swept down again at every turn of the tide; added to which, the waves, by more constantly beating against the rocky eminencies that form the boundary of such a coast, undermine these with greater or less rapidity, according to the nature of the materials composing them, and thus encroach upon the land. In this way it is that hills and mountains, washed by the sea, are by degrees converted into steep or perpendicular cliffs; the progress of destruction continuing, modified however by local circumstances, until the accumulation of the ruins below rendering the shore shallower and less abrubt, enables the waters, as in the former case, to raise upon it a succession of drifts, serving as bulwarks against their own farther encroachments. And then the clifts are left, to be found perhaps ages afterwards in the heart of a populous country, and give rise to a thousand varying opinions as to how they came there. Thus, for example, have been formed those precipices of indurated sand that contribute to the picturesque beauty of the scenery about Tunbridge Wells and East Grinstead, where cliffs of considerable elevation extend in the midst of a cultivated district, situated several miles inland. They are remnants of that marine action by which the valley of the Weald was laid bare. The sea, in which the surrounding chalk rock was deposited, once extended over this older fresh-water or estuaric formation; and afterwards, during the successive elevations of the valley, beating with violence against the bases of the sand ridges, reduced them to their present perpendicular condition. The actual cause of the recession of the waters to the distant limits they now occupy, is a geological phenomenon upon which we need not here speculate, but that it was assisted by the "barring out" operation resulting from the wear in question cannot be doubted. Indeed, evidence of a similar action now in process, is visible in another part of the same district, viz., the East Cliff, at Hastings, the wear of which and consequent accumulation of *debris* at its base, have removed the water many yards from the line to which they formerly extended.

Before quitting this part of our subject, it will be well to notice as point of considerable importance as connected with it and which, although bearing closely upon others to be hereafter discussed, will be more conveniently introduced at present, and with less interruption, perhaps, to continuity, than elsewhere. This action of the sea in wearing down the solid rocks by long continued friction, and afterwards throwing up the finer particles to which it has reduced them, in the form of sand banks, while it extends the more level countries in many parts to its own exclusion, is occasionally productive of considerable local mischief. The sand thus heaped upon the coast is liable, when dried, to be carried by the winds into the interior of the country; and where it happens that its increase is too rapid to admit of its becoming fixed, by the growth of vegetation, one of the most dreadful evils that can befal a cultivated land is preparing, and often with a rapidity that mocks the utmost efforts of human genius and industry to overcome. Many lamentable instances of the effects of the sand-floods, as they have been justly called, might be adduced from various parts of our own island; but the most remarkable example of them is found on the Great Desert of Northern Africa. The notions formerly entertained by Europeans of this vast tract of barren country, equalling, if not exceeding, the Mediterranean Sea in extent, were erroneous in many respects, and its peculiarities appear from the accounts of recent travellers to have been somewhat exaggerated; but although not the unbroken expanse of loose shifting sands previous descriptions had made it, large portions of the sterile surface, occupying journeys of many days and even weeks to traverse, are so covered, and the light material accumulates in wave-like ridges and hillocks, liable to be whirled from place to place by the force of the prevailing winds. The Sahara extends from the shores of the Atlantic eastward to the valley of the river Nile, nearly 3,000 miles, an almost uninterrupted level, without at least being intersected by any ranges of hills sufficient to detract from that general character. The shores are bounded by chains of sand-hills or dunes, and cliffs of sand varying in elevation; and the sea breezes, which in hot climates blow strongly during the night, in consequence of the rarefaction of the atmosphere over the land during the day, and especially over land thus circumstanced, drift this sand continually into the interior, a circumstance that is nowhere more strikingly illustrated than in the present condition of the once mighty kingdom of Egypt. By the influx of the sand, considerable tracts of land, originally cultivated, have been converted into portions of the contiguous desert, and the gigantic ruins of the ancient cities, with their temples and palaces either entombed altogether, or filled to the roof with the insidious but ever-accumulating drift, which has reduced a country, formerly regarded as the granary of the civilised world, to a narrow strip of land on each side of the Nile, whose confined valley has hitherto only been preserved from its overwhelming effects by the annual overflowing of the river, assisted by the high lands and hills which bound its channel on either side.

Where the winds are less constant and violent in one particular direction than the westerly breezes of Northern Africa, nature contrives to fix these sands, by covering them with certain vegetable productions adapted to flourish in such situations only, by whose successive growth and decay a stratum of kinder soil is gradually formed, that renders them in course of time susceptible of cultivation. Several grasses and cyperaceous plants seem to be peculiarly adapted to such purpose, from their tendency to throw out roots from every joint of their procumbent stems, and at the same time to multiply by long runners or suckers that extend below the surface, and which, crossing each other as they increase and branch, form a kind of network that binds the loose sand together, so as to resist the action of the wind. The most efficacious species in this respect is the *Arundo arenaria*, or Sand Reed of Linnæus, *Ammophila arundinacea* of modern botanists, which from growing only on the loose sand thrown up by the sea, has received its English name of Sea Mat-weed. Its great value as a sand-binder may be seen upon almost all of the low sandy coasts of Great Britain, where thousands of acres would, in the lapse of a very few years, be doomed to hopeless sterility were it removed. The Dutch long ago profited by their acquaintance with the utility of this grass; and indeed much of the territory of Belgium, Holland and Jutland, towards the coast, is protected by its natural growth or artificial planting, the latter process being occasionally resorted to on a comparatively large scale, to encourage the formation of dunes, to resist inundation or render its liability less imminent. An act of the legislature was passed in the reign of our queen Elizabeth, and another in that of George the Second, prohibiting, under penalty, its extirpation in this country, where at various periods much land has been lost or rendered useless by the influx of sand; to form any idea of which, approximating to truth, in regard to the ravages produced by it upon cultivation, one must visit from time to time districts liable to such inroads, and notice, during the prevalence of high winds, the manner in which it is carried with a resistless force over the interior. Near Downham, in Suffolk, the sand drift travelled five miles within a century, covering more than a thousand acres of land within that period; but its inroads are often far more rapid. A district of more than ten miles square, near Fores, in Scotland, which on account of its fertility was formerly termed the granary of Moray, was completely inundated by the sand-floods in the course of a few years, so that not a vestige was to be seen of the manor-house, offices, and orchards of the barony of Coubine, to which it belonged; the advance of the flood was so rapid, that it is said an apple tree was buried by it during a single winter, so that only the very summit of it appeared above the surface. This calamity was occasioned by some persons, employed to cut down certain trees in the vicinity, thoughtlessly tearing up the mat-grass that had previously bound the sand-hills. The town of Hull, in Yorkshire, would, probably, long since have been washed away by the sea, were it not protected by Spurn Point, a sandy ridge extending from the north side of the mouth of the Humber, so as to break the force of the tidal waves before they reach the town. This ridge, curving inwards towards the estuary, has itself been formed from the accumulation of materials, washed from the low friable cliffs of Holderness by the southward flow of the tide, which, were they not checked in their progress by the outward flow of the river current, would soon form a bar across the mouth of the inlet. Under the peculiar conditions attaching to this part of our coast, Spurn Point, a mere bank of sand and pebbles, owes its security (exposed to the violence of the storms of the German Ocean) to the binding power of the mat-grass. The toughness of the stems of this grass has given them a value in many parts of the country, especially in the north, where they are often manufactured by the peasantry into mats and a kind of rope; but their appropriation to such purposes should be watched with a jealous eye, as their extermination is liable to be attended with so much danger to the neighbouring lands, over which the sand, once unbound, spreads with a pace that cannot be checked by any means but those which nature herself has pointed out.

To return to the subject from which we have been here slightly digressing—the action of the sea upon the land. Changes similar to those mentioned have occurred, and are still taking place, in all parts of the world, wherever the antagonistic elements, water and land, come in contact: generally slow in progress, and operating in most instances within limits too confined to attract more than fleeting and partial notice, unless by comparison with past events of the same kind, rarely recorded in history, because of their apparently trivial connexion with general economy, and the merely local interest they excited when recent. If we would trace the effects of such revolutions, on the broad scale in which they seem to have acted in certain situations, our computation of periods required to produce them is carried back far beyond the most remote of human historic epochs. Let us instance the lapse of time since the distribution of sand commenced upon the African desert. Who shall pretend to enquire, far less to decide the question? Since the days of the earlier Pharaohs, when Egypt was a powerful state, and its capital Thebes a wonder of the world, the Sahara has occupied its western border; and although we have few data before us, concerning the condition of the mighty space it occupied beyond at that period, we have no reason to believe its whole extent greatly altered during the 3,500 years since passed. The mind of man is excited by sudden and violent changes, when they affect him either immediately or through any of the numerous bonds connecting him with society at large, but it dwells not upon the slow and the distant. The eruption of Vesuvius that overwhelmed the cities and vineyards of southern Italy, in the time of the Elder Pliny, would have made little impression upon the modern European, had not Pompeii and Herculaneum been disentombed, and the domestic economy of their unfortunate inhabitants of 1800 years past been opened to his gaze. The earthquake that destroyed the city of Lisbon in 1755 is still a theme of discourse and dread; it made Europe tremble to its utmost confines, and shook the foundations of the whole north Atlantic; but the citizen of London who takes his evening stroll upon the chain pier at Brighton, dreams not that less than two hundred years ago, the original town, instead of occupying the site of the present, stood where the waves now roll beneath him. Local records establish the fact of occasional inundation there, destructive of life and property; but the necessary transit of the growing town from the sea-beach to the former corn fields and pasture has been gradual and unmarked; and such is the case with many of the most important dispensations by which the surface of the earth has been modified to its present condition.

No circumstance can be more obvious than the necessity of such a distribution of inorganic matter as now exists upon a globe destined for the reception and maintenance of organic and living bodies. Astronomers, unable to trace the existence of an atmosphere about the moon, and led from that supposed fact to doubt the presence of water upon its surface likewise, are disposed, and with reason, to regard it as uninhabited; indeed, as a globe whose irregular mountainous and cavernous exterior consists of solid, crystalline, or vitrified matter. There are plains and slopes upon it, which some have conceived to resemble alluvial districts upon the earth, uncovered with vegetation; but the manner in which the light is reflected from these is scarcely consistent with such a character, and favours rather the opinion that these spaces are more accordant with the condition of fields of lava or some analogous volcanic rock, than with that of any pulverised or pebbly substance distributed like our sand and gravel; while the mountains rather appear in the state of masses raised like bubbles and shattered by explosion, than as having been subjected to slow and long-continued action by attrition; indeed, there is no evidence, under the present power of our telescopes, vast as they are, of the moon's face being under the influences of causes of change correspondent to those affecting that of her primary. Were an atmosphere and water now to be supplied to our attendant orb, and the latter element to fill at once the deep dark voids once supposed to be seas, without the breaking up of the solid surface, few of the conditions necessary to the production of organic being could be effected. What a countless series of revolutions must be fulfilled, before the wearing action of a lunar ocean, with its wind, waves, tides, and currents, could produce a series of stratified rocks, proportionally like those, over which the loose deposits favourable to the growth of earthly vegetation have accumulated—yet through such a period our earth has passed! Let us admit the possibility of this, and presuming, without much violation of the doctrine of probability, that its surface was at first similar to that of its satellite; and that with the first condensation of watery vapour upon the cooling crystalline solid commenced those movements of the ocean in which alluvial deposits originated—then let us bear in mind the existing necessity for the successive increase and modification of these latter, in order to the production of those diversified phenomena that an undisturbed and unchanging rocky surface could never have yielded, and we shall be led to estimate at no small value the illimitable agency which this vast body of water has fulfilled, and it is probably still destined to fulfil in the economy of the earth; an agency, however, far from being thus confined. The ocean does not occupy a proportion of such extent as three-fourths of the surface without being intimately connected with the other powers at work there, and contributing to the same end.

THE CHEMISTRY OF MANURES.

GYPSUM AND SALT.

TO THE FARMERS OF NOTTINGHAMSHIRE.

GENTLEMEN,—None of the sulphates of the various earths and metals occur so abundantly in the natural state as the sulphate of lime, or gypsum.

You are no doubt all aware that there are several quarries in our own immediate neighbourhood from which large quantities are annually procured, and in Derbyshire it is still more abundant. Some of the beds in Derbyshire are exceedingly pure; and very large quantities in the unburnt state, ground to a fine powder, are sent to London, not only for the purpose of adulterating articles of food and luxury, such as flour, sugar, lozenges, &c., but also for mixing with Peruvian guano—a trick which, I am sorry to say, has been known to be practised to an enormous extent.

The chemical composition of gypsum is lime 28 parts, sulphuric acid 40 parts, and water 18 parts. It is a compound, therefore, capable of supplying both lime, sulphur, and sulphuric acid to plants.

When gypsum is burnt it loses all its water, and is converted into plaster of Paris, the uses of which are too well known to require explanation.

Burnt gypsum dissolves with greater difficulty than unburnt, but both require a large amount of water for their solution. A gallon of water will only take up about 3 drachms of unburnt gypsum, so that, valuable as it may be as a manure, large quantities at a time can never be needed. A dressing of 3 cwt per acre, whether applied to clover, which on certain descriptions of land it so greatly benefits, or to other green crops requiring sulphur, will be found to be ample.

The addition of gypsum to the dung heap is very valuable for improving the quality of the manure and assisting a little in the fixing of ammonia; I say a little because it only acts in the presence of a great deal of moisture, which, in the case before us, is rather an evil than an advantage. As a fixer of ammonia in the tank its effects are more observable, because there is more liquid for its solution. In this state, therefore, it produces the greatest benefit; but the refuse salt cakes of the nitric and muriatic acid manufacturer are far more valuable for this purpose.

The benefits which arise from the use of common salt are due to the chlorine and sodium which it contains. All fertile soils and all edible plants contain it; but its solubility favours its easy removal from the soil, hence the need of its being applied more frequently than gypsum.

When mixed with farm-yard manure as I have previously directed, it improves the quality, causes a more complete decomposition of the manure, and furnishes the best mode of supplying it to the soil. Salt and lime mixed together in some cases are not to be despised. These mutually decompose each other, forming a muriate of lime and carbonate of soda. The carbonic acid, as fast as it is absorbed from the atmosphere by the lime, goes over to the soda contained in the common salt, at the same time the muriatic acid with which the soda is associated transfers itself to the lime, forming a muriate of lime; thus you will perceive that the soda and lime exchange their acids.

Such a compost as this is most destructive to insect life, but it is requisite that the lime and salt should remain together several months before the change becomes complete.

Salt acts in a similar way with gypsum, for when these two are in contact for any length of time they are converted into sulphate of soda and muriate of lime.

The sulphate of soda is much more soluble than the sulphate of lime, hence the advantage of applying salt and gypsum to the soil after they have been mixed together several months, thereby enabling the plant to take up the sulphur more readily and in greater abundance. A portion of the soda here liberated would be returned again to the soil, and have a tendency to combine with or decompose the silicates contained therein, rendering them more soluble and in a fit state to be taken up by plants. It is probably owing to this property which it possesses that the straw of wheat is rendered so bright and stiff after a dressing of salt.

I will now draw your attention for a short time to what is usually termed the "clover sickness."

It having been disputed by several of the most influential farmers in the neighbourhood that lime exercises any beneficial influence upon the clover plant, and one gentleman even going so far as to assert that Professor Liebig committed an error in classifying it among the family of lime plants at all; let us endeavour to make out what are the constituents requisite for the production of a good crop of clover, which, perhaps, may be a guide as to the kind of management which ought to be employed in this particular instance. By argument and investigation we can only arrive at the truth; and when we are in possession of a knowledge of the ingredients removed from the soil by the clover crop, we must naturally infer that the absence or deficiency of one or more of the substances which enter into its composition will be a hindrance to its full and perfect development.

According to the analysis of the late Mr. Haywood, of Sheffield (whose melancholy death you will recollect having been recorded only a few months ago), 2 tons of clover remove from the soil—

Nitrogen	132 lbs.
Phosphoric acid	20 „
Alkalies (potash and soda)	61 „
Earths (principally lime)	146 „
Silica	10 „
Sulphur	6 „

Before I proceed any further I should wish you to understand that nitrogen, the first-mentioned component part of clover, may be represented in the soil by organic matter—such as vegetable fibre, farm-yard manure, or in fact by any other substance capable of producing ammonia, all of which must contain *nitrogen*, which, as I have explained in a former letter, is converted by the properties of lime, first into nitric acid and subsequently into nitrate of lime. I need scarcely say that the treatment of the land must vary according to its nature; thus a good marly or loamy soil will generally contain a sufficiency of the alkalies, a sandy or gravelly soil quite enough of silica in a soluble state after it has been well limed, or a soil full of vegetable matter will for the most part be found to contain the requisite quantity of nitrogen; but as we cannot arrive at any accurate conclusions with regard to the treatment of the different kinds of soil without first having them analysed, I can only give you a general prescription, which will answer in every case, because it will supply *all the ingredients which are required.* For the clover crop then I would recommend a dressing of 4 cwt. of superphosphate of lime, 1 cwt. of common salt, 1 cwt. of gypsum, and ½ cwt. of potash, or 1 cwt. of wood ashes. The superphosphate, when properly prepared, will furnish all the organic matter and phosphoric acid; the salt will aid greatly in supplying the alkalies, provided the land contains plenty of lime, which, as you have seen, will convert the salt into carbonate of soda, in which case the potash or wood ashes may partly be dispensed with; and the gypsum will afford the necessary quantity of sulphur and lime. But, in addition to all these, the mechanical state of the soil has also something to do with the healthy and luxuriant growth of this valuable crop. Who has not observed that clover arrives at the highest degree of perfection where the ground has been well trodden and rendered comparatively solid by the feet of animals? And therefore, where the soil is light and of a porous texture, a good rolling with a heavy roll or Crosskill will be found to be of great benefit.

These are the necessary conditions, according to my idea, for the production of a good crop of clover, which, if strictly adhered to, will in the generality of cases be attended with success, and we then shall not hear so many complaints about the "clover sickness" as hitherto; for it must ever be borne in mind that when a plant is furnished with *all the necessary articles of food*, the land being at the same time in a proper condition, it is then, and then only, that you may reasonably expect a first-rate crop.

I have now treated upon the principal manures in general use, with the exception, perhaps, of the sewerage of large towns, which, in the absence of the means of application, it would here be useless to dwell upon. With regard to this subject, however, I will just remark that thousands, nay I might almost say millions of pounds' worth of manure is annually carried away by the rivers of this country, and entirely lost, so far as we are concerned; but I trust the period may not be far distant when these wasted manures will also be made subservient to the increased production of the soil.

SAML. PARR.

MALT COOMBS consist of the radicles of seed protruded by vegetation, caused by steeping barley in water for malting, and which are rubbed off during the process of kiln-drying and cleaning. They must contain saccharine matter, and are used for feeding cows and pigs, and for spreading on the floors of pigeon and poultry houses, and also as a manure. The dust of low-dried malt is not so stimulant as that of high-dried; but more lasting from that circumstance and the quality of the barley. It is used dry and unfermented as a top-dressing on wheat, at the rate of forty bushels on an acre, and may be drilled with the seed of barley and turnips at the same rate; and is often scattered on the last harrowing of barley tilth, and then rolled. It sells at 5s. or 6s. per quarter, and as much have been used as ten quarters per acre for wheat, eight for barley, and four for grasses. The effects are quick; and it may be mixed with lime and salt, earths, and stable-dung, and kept moist and covered from rain, and twice or thrice turned over. Such light manures as require no preparation by decomposition, and are not too gross or caustic to be applied by themselves, may be most economically used unmixed, and without the expense that will attend every step in the application.

THE FROST AND ITS CONSEQUENCES.

BY CECIL.

"How is it you are not hunting to-day?" exclaimed an elegant young lady, whom I happened to meet on the parade at Cheltenham, on a fine frosty morning, and who was seasonably protected with furs sufficient to supply a company of light infantry on duty in the Crimea.

"We cannot hunt in such weather as this," was my reply.

"Oh!" rejoined the young lady, "my brother is gone."

"Indeed!" was my response, as it instantly occurred to me that the young gentleman must have had some other game in view than a fox, and therefore, unwilling to spoil his sport, I immediately turned the conversation to subjects upon which the fair portion of the creation are supposed to be better acquainted.

On the following morning I happened to meet this enthusiastic votary of Diana, and, with much gravity of countenance, inquired what sport he had had with the hounds? Puzzled and confused, a crimson current flushed over his cheeks—even the male sex can blush at times; he had no idea that his hunting exploit had been related to me, and suspected that I might have guessed at the true cause of his morning's ride. In this he was not altogether mistaken. With much earnestness, he begged me to inform him why I asked him such a question. To relieve his suspense, I related what had passed. Pledging me to confidence, and urging me not to involve him in any dilemma with his family, he frankly told me he had met a young lady at a ball, who resided at some distance in Worcestershire, and, wishing to make a call, in order to account for his absence, had told his mother and sisters he was going to meet the hounds. They being totally unacquainted with all matters connected with venatic pursuits, the excuse was received by them. Having satisfied him that I had not enlightened his sister, and assuring him that I would not render any information that would compromise him with his family, his mind was at ease on those points. With a serious aspect, he told me he feared his ride had occasioned some injury to his hunter; that he was very ill, and requested me to go and see him. Complying with his wishes, I found the animal in a small two-stall stable, such as are usually met with attached to villa residences in the vicinity of Cheltenham. There was another horse in the adjoining stall, and every crevice being stopped with almost hermetical precision, the heat and closeness of the atmosphere afforded a striking contrast to the coldness without. In the manger was a feed of corn untouched, and hay in a similar state in the rack. The animal was labouring under the effects of fever and sore throat; his legs were as cold as the icicles on the exterior of the building, his ears chilly and wet; on his shoulders, under the rug, clammy perspiration was perceptible; the feet were evidently in a painful state, and there was reason to apprehend that inflammation of the lungs might ensue. While I was examining the horse, my young friend informed me he had ridden him fast—a piece of information which he need not to have given; it was inferred, and the poor animal confirmed all preconceptions on that point. The distance was nearly five-and twenty miles. He added, that he had given strict injunctions to the servant to put his horse in a warm stable, throw a cloth over him, and trusted to his being taken care of. "It is very certain," continued he, "that none of my requests had been complied with. When he was brought to the door for me to return, his coat was quite wet; he had not even been wiped over, neither do I think his bridle had been taken off. The poor beast was shivering with cold, but I did not apprehend any bad consequences, supposing that by riding him home at a brisk pace, the circulation of the blood would be restored, and all would be right. Before he reached home he was much tired—more so than I ever knew him to be, after a run with hounds. My servant informed me this morning that he would not feed, and appeared unable to drink his water. What do you think of him, and how must he be treated?"

"In the first place," I said, "you must admit more air into your stable—a difficult matter in such a confined place, without subjecting the inmates to a draught. The most dangerous symptom at present is the sore throat; and you will indeed be fortunate if he does not become a roarer. Have some mixed mustard applied to the throat without delay—it is an excellent remedy in such cases; you may repeat it frequently, and unless used in too great quantity, will not disturb the hair; foment his feet in warm water, and poultice them; have his legs well hand-rubbed and bandaged; have his ears dried; keep up the circulation in the extremities, and compensate for a cooler atmosphere in the stable, by an extra rug, if necessary; give him bran mashes, linseed gruel, and no hay; a gentle laxative, combined with nitre; and if he does not improve, send for a veterinary surgeon."

As these instructions were being put into effect, I interrogated my young friend concerning the stable in which his horse had been placed. He replied that he did not then see it, but on other occasions when he had been there, there was a large building appropriated to visitors' horses and that in all probability it was unoccupied and very cold.

"Now," said I, "let me give you a little sketch of what has occurred, as it will be a lesson for the future. You were, in your own imagination, transported on the wings of love, forgetting that your horse was composed of less aërial substance; the road was extremely hard, and the concussion produced soreness in the feet; this was probably increased, in consequence of your horse standing on the cold paving of the stable, in all probability without any straw; a sudden check ensued throughout the system. The poor animal was not fed, and in cold weather horses are less able to sustain hunger than when it is warm. You rode back at a quick pace, and the circulation was again subjected to an extreme; when he reached his home your horse was doomed to the ill consequence of a close stable. These excessive transitions cannot be borne with impunity. There is not a greater error than that of keeping horses in hot stables in frosty weather. The extreme is so great when they are taken out, that various maladies are engendered, more especially affections of the respiratory organs, which so frequently result in roaring."

This case, in a modified degree, bears analogy to the sad fate of our cavalry horses in the Crimea. Many causes of the mortality amongst them may be traced to grievous mismanagement, and that from the very hour of their being enrolled in the service. The style of horse selected is unsuitable, to begin with. They are mostly tall, leggy, lengthy animals, sixteen hands high or more; instead of thickset, shortlegged active nags, from fifteen hands to fifteen two inches, muscular and strong. The plan persisted in by agriculturists generally, of rearing young horses is erroneous; and until some measures be adopted to induce them to change the system of filling them to repletion with grass in the summer, which generates fat, and consigning them to a state of demi-starvation in the straw yard during the winter, the stigma will continue to be attached to the stock, of want of constitution. Every foxhunter knows the importance of condition in a hunter. If he buys one from a farmer who has bred him up after the fashion I have just described, twelve months must elapse before the animal can be got in a fit condition to follow hounds; if not, what is the consequence? During the early part of the season the poor creature is unable to bear the fatigue; he probably tires in the field; if not, he shows unmistakeable symptoms of debility on his return to the stable. This debility is not constitutional, but the effect of injudicious treatment, and may be overcome by good care and time. Towards the latter end of the season, if well managed he improves; and, if his owner be an experienced sportsman, the enervating properties of succulent green herbage are withheld. It is the abundance of gross fat-producing grass, which so many of our English horses are condemned to eat, which destroys their condition, and superficial observers scandalise them as deficient in stamina.

But to return to the cavalry horses. The mode adopted of transporting them to the scene of action was faulty, and the authorities were cautioned, at the commencement, by a gentleman who had had great experience in such matters, that, if they were shipped for so long a voyage on the old-fashioned plan of keeping them on their legs, the consequences would be seriously injurious; and his predictions were correct. But all the proceedings connected with this melancholy war have been conducted by men whose experience is confined to office duties, in preference to those who have had practical opportunities of obtaining information. Thus have thousands of human lives been sacrificed, horses innumerable, and money incalculable. Badly managed on their voyage, the horses landed in a deplorable state; they were, of course, required for immediate service, and put to hard work before they could possibly recover. Without suitable shelter, and, what was still more distressing, without adequate supplies of food, they were called upon to perform the laborious duty of dragging heavy guns, ammunition wagons, and other implements of warfare through mud and mire. When the severe weather commenced they were exposed to additional evils, like the hunter of my friend at Cheltenham, but to a much greater extent. Their exertions would cause them to perspire profusely, in which state they were necessarily exposed to the inclemency of the nocturnal atmosphere. This would speedily produce catarrhal affections; but there was no time to rest them, and put them under medical treatment. To work they must go again on the following day, and any person conversant with horses must know that the poor creatures could not last long under such trying circumstances. Many which did not perish in the night would inevitably die on duty. Why have the French cavalry been more fortunate? many of the horses are English bred ones. The answer is readily given—because they have not had such difficulties to encounter in a long voyage over the ocean, and they were better provided for when they landed.—Sunday Times.

SCOTCH AGRICULTURAL STATISTICS.

The following is a summary of the aggregate quantity of acres under the following crops, together with the number of stock and the grass produce as per return of the Highland Society's report:—

Total Imperial acres	12,613,343
Under Wheat	168,216
— Barley	207,507
— Oats	932,994
— Rye	3,809
— Bere	18,118
— Beans	37,702
— Peas	6,169
— Vetches	13,442
— Turnips	433,915
— Potatoes	143,032
— Mangold	1,947
— Carrots	1,218
— Cabbage	1,893
— Flax	6,670
— Turnip Seed	1,429.
— Bare Fallow	26,129
— Rotation Grass	1,427,790
— Permanent Pasture	1,207,101
— Irrig. Meadow	69,256
— Sheep Walks	6,530,843
— Houses, Fences, &c.	130,539
— Waste	830,730
— Woods	413,391

STOCK.

Horses	156,595
Milk Cows	292,865
Other Cattle	438,334
Calves	205,172
Ewes, Gimmers, and Ewe Hogs	3,360,289
Tups, Wethers, and W. Hogs	1,426,946
Swine	163,683

PRODUCE.

	Gross.
Wheat	4,848,499 bush
Barley	7,639,601 —
Oats	33,854,319 —
Bere	537,250 —
Beans	1,080,921 —
Turnips	6,872,189 tons
Potatoes	523,383 —

CABBAGES.—For the purposes of the dairy one acre of cabbages is considered to be worth three of turnips. They require to be raised from seeds sown in beds in autumn or spring, and transplanted into the field towards the end of May, or in the beginning of June, and will be ready for use in October. One pound of seed will produce 24,000 plants, and about 8,000 plants are required to an acre of ground. The beds must be well-sheltered, and have a free exposure to the sun of the whole day. The nutritive matter of the cabbage is wholly soluble in water, that of the potato only partially so, as a great proportion of the potato consists in starch. One pound of drumhead cabbages, York cabbages, and green curled kale gave in grains of

	Drumhead.	York.	Kale.
Nutritive matter	430	430	440
Woody fibre	280	312	880
Water	6,290	6,258	5,680

STALLIONS FOR THE SEASON 1855.

Name.	Colour.	Age.	Pedigree.	Performances.	Principal Performance.	No. of Winners out by	Sire of	Standing at	Apply to	Price.
Abernethy	—	—	by Physician, dam by Orville	never appeared	—	—	—	Sandhutton, Thirsk	Mr. M. Wright	5 gs., h. b. 2 gs.
Alarm	bay	13	by Venison, out of Southdown, by Defence	started 17, won 13	won Ascot Cup	23	Frantic	Newmarket	Messrs. Barrow	12 gs.
Ambrose	black	6	by Touchstone, out of Annette, by Priam	started 19	—	untried.	—	Burghley, Stamford	Mr. H. Rose	15 gs.
Annandale	brown	13	by Touchstone, out of Rebecca, by Lottery	started 15, won 3	ran second for Derby	17	Goorkah	Lane Paddocks, Sheffield	F. Croft	15 gs.
Archy	bay	16	by Camel, out of Garcia, by Octavian	started 8, won 3	won £1000 at Newmarket	5	Bessie	Swallcliffe, Banbury	Mr. Gulliver	10 gs.
Augur	chesnut	6	by Irish Birdcatcher, out of Nickname, by Ishmael	started 4, won 3	won Champagne Stakes	untried.	—	Boston	Mr. Snaith	2½ gs.
Backbiter	brown	10	by Gladiator or Don John, out of Scandal, by Selim	started 24, won 5	won Goodwood Stakes	untried.	—	Market Deeping	Mr. Markwell	12 gs.
Barnton	bay	11	by Voltaire, out of Martha Lynn, by Mulatto.	started 3	—	3	Fandango	Reyburne, Middleham.	Mr. Ridley	7 gs.
Bay Middleton	bay	22	by Saltan, out of Cobweb, by Phantom	started 7, won 7	won the Derby	108	Flying Dutchman	Danebury	Mess. Weatherby	50 gs. (25 mares)
Bedouin	bay	—	by an Arabian, dam by Wanderer	never appeared	—	untried.	—	Ashdean, Chichester	Mr. Gilbert	2 gs.
Bessus	brown	14	by Bay Middleton, out of Brown Bess, by Camel	started 1, won 1	won Two-year-old Stakes at Stockbridge	untried.	—	Theobald's Park, Enfield	Mr. Gray	11 gs., h. b. 5½ gs.
Birdcatcher, Irish	chesnut	22	by Sir Hercules, out of Guiccioli, by Bob Booty	started 15, won 6	won the Madrids	123	The Baron	Easby, Richmond, York	Mr. Jaques	50 gs. (20 mares)
Bishop of Romford's Cob	bay	15	by Jereed, out of Jemima, by Count Porro	started 61, won 26	won the Royal Hunt Cup	untried.	—	Cholwell, Totnes	—	5 sovs.
Black Doctor	black	7	by The Doctor, out of Betsy Bird, by Voltaire	started 48, won 7	won Manchester Cup	untried.	—	Salford, Manchester	J. Richardson	5 gs., h. b. 3 gs.
Black Eagle	black	9	by Voltaire, out of Cytherea, by Camel	started 8, won 2½	won £150 at Newmarket	untried.	—	Knighton, Radnor	Mr. F. Griffiths	5 sovs.
Black Prince	black	13	by Touchstone, out of Queen of Trumps, by Velocipede	started 1	—	1	Liberty	Water Tower, Rugby	Mr. Walker	2½ gs.
Blaze	brown	9	by Launcelot, out of Flambeau, by Turcoman	started 13, won 4	won Hopeful Stakes	untried.	—	White Hart, Welwyn	Mr. Tredgett	5 gs., h. b. 2 gs.
Bolingbroke	chesnut	8	by John o' Gaunt, out of Spangle, by Crœsus	started 7, won 3	won the Prendergast S.	untried.	—	Hillsborough, Ireland	J. Donald	6 sovs., h. b. 2 sovs.
Bowstring	chesnut.	11	by Amaranth, out of Miss Bowe, by Catton	started 16, won 9	won Bickerstaffe Stakes.	untried.	—	Taunton	Mr. Hopkins	5 gs., h. b. 3 gs.
Brocket	bay	5	by Melbourne, out of Miss Slick, by Muley Moloch	started 7, won 3	won Royal Hunt Cup	untried.	—	Denham Place, Uxbridge	Mess. Weatherby	10 gs.
Buckthorn	bay	6	by Venison, out of Zeila, by Emilius	started 18, won 6½	won Ascot Stakes	untried.	—	Eaton Stud House, Chester	—	10 sovs., h. b. 5 sovs.
Burgundy	bay	12	by Ismael, out of Caroline, by Irish Drone	started 24, won 13	won Newton Manor Cup	6	Deformed	Turf Tavern, Doncaster.	W. Daykins	5 gs., winners and [dams of 3 gs.
Caliban	bay	4	by Nutwith, out of Camera Obscura, by Ellis	started 5	—	untried.	—	Cross-street, Finsbury, &c.	Mr. Lawes	10 gs., h. b, 5 gs.
California (Bro. to Riddlesworth)	chesnut	12	by Emilius, out of Filagree, by Soothsayer	never appeared	—	6	May Day	Bushbury, Wolverhampton	Mr. Phillips	5 gs., h. b. 3 gs.
Calmuck	bay	22	by Zinganee, dam by Rubens	started 27, won 12	won Gorhambury Stakes	—	—	Newland, Hull	D. Price	7 gs., h. b. 2 gs.
Cariboo	brown	8	by Venison, out of Jamaica, by Liverpool	started 39, won 17½	won Ascot Vase	untried.	—	Beverley	Mr. Pickering	7 gs., h. b. 2 gs.
Cardinal, The	bay	4	by Touchstone, out of Crucifix, by Priam	never appeared	—	untried.	—	Ward End, Birmingham	—	5 gs., h. b. 2 gs.
Caster, The	bay	15	by Emilius, out of Cast-aside, by Mameluke or Camel	started 11, won 4	won the Levant	2	The Setter	Sledmere, Malton		5 gs., h. b. 3 gs.
Catesby	bay	14	by Slane, out of Cobweb, by Phantom	started 1	—	4	Welshbourne	Warwick	Mr. Brown, V.S.	10 gs., h. b. 3 gs.
Chabron	bay	11	by Camel, out of Fanny, by Whisker	started 20, won 4	won £90 at Newmarket	—	—	Duddinghill, Willesden.	T. Bullock	8 gs.
Chanticleer	grey	12	by Irish Birdcatcher, out of Whim, by Drone.	started 37, won 21	won Doncaster Cup	8	Bonnie Morn	Rawcliffe-farm, York	T. Bateson	20 gs. (30 mares)
Chatham	chesnut	16	by The Colonel, out of Hester, by Camel	started 16, won 8½	won the Criterion	17	Sittingbourne	Ham, Arundel	Mess. Weatherby	20 gs.
Chatterbox	chesnut	8	by Magpie, out of Clara, by Smolensko	started 23, won 11	won Liverpool Leger	untried.	—	Cawwood, Selby	Mr. C. Smith	5 gs., h. b. 2 gs.
Cleveland Short-legs	bay	8	a pure Cleveland horse	—	—	—	—	Duddinghill, Willesden.	J. Bullock	
Clumsy	bay	13	by Bay Middleton, out of Skilful, by Partisan	started 8, won 2	won £200 at Newmarket	untried.	—	Truro, &c.	Mr. R. Sparks	5 gs., h. b. 2 gs.
Collingwood	bay	12	by Sheet Anchor, out of Kalmia, by Magistrate	started 70, won 34	won the Royal Hunt Cup	1	Lucy Banks f.	Newmarket	Messrs. Barrow	12 gs., h. b. 7 gs.
Confessor	bay	7	by Cowl, out of Forest Fly, by Mosquito	started 8, won 2	won Great Yorkshire H.	untried.	—	Theobald's Farm, Enfield	Mr. A. Gray	11 gs., h. b. 5½ gs.
Connaught Ranger	chesnut	11	by Harkaway, out of Guiccioli, Bob Booty	started 32, won 4	won the Corinthians	untried.	—	Rawcliffe-farm, York	T. Bateson	5 gs.
Constantine	bay	5	by Cotherstone, out of Crucifix, by Priam	started 2	—	untried.	—	Turf Tavern, Doncaster	—	5 gs., h. b. 3 gs.

Cossack	chesnut	11	by Hetman Platoff, out of Joannina, by Priam	started 19, won 3	won the Derby	untried.	—	Neasham, Darlington	Mr. Cookson	15 sovs. (45 mares)
Cotherstone	bay	15	by Touchstone, out of Emma, by Whisker	started 11, won 7½	won the Derby	51	Saraband	Althorp, Northampton	Mr. Elliott	12 gs. (20 mares)
Cowl	bay	13	by Bay Middleton, out of Crucifix, by Priam	started 8, won 5	won Buckenham S.	24	Dervish	Leybourne, Maidstone	Mr. Tweed	20 gs. (20 mares)
Crozier	bay	11	by Lanercost, out of Crucifix, by Priam	started 13, won 3½	won £650 at Ascot	4	Simon Pure	Ardee, Louth, Ireland	Mr. Hatch	4 sovs., h. b. 2 sovs.
Cure, The	brown	14	by Physician, out of Morsel, by Mulatto	started 26, won 16	won the Claret	7	Lambton	Catterick	Mr. C. Pybus	10 sovs. [gratis
Damask	black	8	by Touchstone, out of Moss Rose, by Blacklock	started 3, won 1	received a match forfeit.	untried.	—	Court Lodge, Sutton	Mr. Coleman	h.b. 2½ gs., th.-bred
Daniel O'Rourke	chesnut	6	by Birdcatcher, out of Forget-me-not, by Hetman Platoff	started 10, won 2	won the Derby	untried.	—	Slodmere, Malton	—	10 gs., h. b. 3 gs.
Darkie	brown	8	by Sir Hercules, out of Dark Susan, by Glaucus	started 16, won 3	won Granby Handicap	untried.	—	Lutterworth, Leicester.	Mr. Lucas	10 gs., h. b. 3 gs.
Dr. Hampden	bay	8	by Dulcimer, out of Rachael, by Newton	never appeared	—	untried.	—	Summer Town, Oxford	Mr. Beazeley	5 gs., h. b. 2 gs.
Dupe	brown	5	by Pantaloon, out of Decoy, by Filho-da-Puta	never appeared	—	untried.	—	Newton, Warrington	Mr. Clarke	5 sovs., h. b. 2 sovs.
Elcot	bay	6	by Venison, dam (half-bred) by Defiance	started 7, won 3	won Woodcote Stakes	untried.	—	Marlborough	Mr. Dixon	5 gs., h. b. 2½ gs.
Emerystone	brown	6	by Touchstone, out of Gulhane, by Physician	started 11, won 2	won £50 at Chester	untried.	—	Foxholes, Garstang	—	5 gs., winners, and dams of, *gratis*
Era, The	bay	15	by Plenipotentiary, dam by Whisker	started 26, won 7	won Liverpool Cup	2	Miss White	Langrie Ferry, Selby	Mr. R. Hepworth	5 gs., h. b. 2 gs.
Essedarius	chesnut	9	by Gladiator, dam by Velocipede	started 8, won 2	won Somersetshire S.	untried.	—	Wentworth, Rotherham	T. Honess	10 gs.
Fallow Buck	bay	10	by Venison, out of Plenary, by Emilius	never appeared	—	1	Deerhound	Andler's Ash, Liss, Hants	Mr. W. Ayling	11 gs.
Faugh-a-Ballagh	brown	14	by Sir Hercules, out of Guiccioli, by Bob Booty	started 9, won 5	won St. Leger	40	Goldfinder	Dean's Hill, Stafford	Mr. Painter	12 gs.
Fernhill	brown	10	by Ascot, out of Arethusa, by Elis	started 34, won 11	won Metrop. Handicap	untried.	—	Wrawby, Brigg	Mr. Ashton	7 gs.
Filbert	bay	5	by Nutwith, out of Celia, by Touchstone	started 36, won 10	won the Claret	untried.	—	Halling Court, Rochester	Mr. Wyatt	5 sovs., h.b. 3 sovs.
Filius	bay	6	by Venison, out of Birthday, by Pantaloon	started 9, won 1	won £1,600 at Goodwood	untried.	—	Newmarket	Messrs. Barrow	7 gs., h. b. 3½ gs.
Flatcatcher	bay	10	by Touchstone, out of Decoy, by Filho-da-Puta	started 26, won 16	won 2,000 Gs. Stakes	4	Usurer	Oswaldkirk, Yorkshire	R. Thorpe	5 sovs.
Flying Dutchman	brown	9	by Bay Middleton, out of Barbelle, by Sandbeck	started 16, won 15	won the Derby	untried.	—	Rawcliffe Farm, York	T. Bateson	30 gs., (30 mares)
Footstool	bay	12	by The Saddler, out of Trudge, by Tramp	started 24, won 13	won Swinley Stakes	2	Oleaster	Newmarket	Messrs. Barrow	10 sovs., h. b. 5 sovs.
Foxberry	bay	16	by Voltaire, out of Matilda, by Comus	started 39, won 9	won Glasgow Cup	—	—	Prestbury, Cheltenham	Mr. Ballinger	—
Fugleman	chesnut	10	by The Saddler, out of Camp Follower, by The Colonel	started 22, won 4½	won Hampshire Stakes	untried.	—	Thornton, Pickering	Messrs. Pickering	5 gs., h. b. 2 gs.
Gabbler	bay	11	by Bay Middleton, out of Flycatcher, by Godolphin	started 14, won 2	won £325 at Doncaster	3	Garrulity	The Lodge, Brackley	Mr. Painter	5 gs., h. b. 2 gs.
Galaor	bay	17	by Muley Moloch, out of Darioletta, by Amadis	started 13, won 5	won Manchester Cup	8	Guicowar	Murton, Bridlington	Mr. Smith	5 gs , h. b. 2 gs.
Gameboy	brown	13	by Tomboy, out of Lady Moore Carew, by Tramp	never appeared	—	10	Trousseau	Easby, Richmond, York	Mr. Jaques	10 gs., h. b. 3½ gs.
Gazelle	—	—	An Arabian	ran well at Calcutta		untried.	—	New House, Dunbar	Mr. Richardson	7 gs.
Glenalvon	bay	9	by Coronation, out of Glenlui, by Sultan	started 20, won 6	won Ascot Vase	untried.	—	Old Field Farm, Acton	Mr. W. Mason	7 gs., h. b. 4 gs.
Grecian	chesnut	7	by Epirus, out of Jenny Jumps, by Rococo	started 4, won 2	won July Stakes	untried.	—	Theobald's Farm, Stockwell	Mr. S. Matthews.	8 sovs.
Grey Tommy	grey	6	by Sleight-of-Hand, dam by Comus	started 10, won 3	won £180 at Reading	untried.	—	Lowfield, Sussex		5 gs., h. b. 3 gs.
Grimston	chesnut	12	by Verulam, out of Morsel, by Waxy	started 36, won 14	won Goodwood Cup	untried.	—	Ardee, Louth, Ireland	Mr. Hatch	4 sovs., h. b. 2 sovs.
Grosvenor	brown	7	by Touchstone, out of Miss Beverley, by Stockport	started 3, won 1	won Plymouth Vase	untried.	—	Woodhouse, Aldford		5 gs., d. of winners
Harkaway	chesnut	21	by Economist, dam by Naboclish	started 38, won 25	won Goodwood Cup (2).	78	King Tom	Duddinghill, Willesden.	T. Bullock	20 gs. [*gratis*
Hero, The	chesnut	12	by Chesterfield, out of Grace Darling, by Defence	started 37, won 29	won Emperor's Plate	3	Namur	Wentworth, Rotherham	T. Honess	10 gs.
Hesperus	bay	6	by Bay Middleton, out of Plenary, by Emilius	started 14, won 8	won Glasgow Stakes	untried.	—	Woburn Abbey, Beds.	—	5 sovs.
Hobbie Noble	bay	6	by Pantaloon, out of Phryne, by Touchstone	started 14, won 5	won New Stakes	untried.	—	Willesden Paddocks,	Mr. C. Phillips	10 gs.
Hotspur	brown	9	by Sir Hercules, out of Dexterous' dam (half-bred) by Defence	started 9, won 2	ran second for Derby	untried.	Harkaway	Wroughton, Swindon	G. Eatwell	5 gs., h. b. 2 gs.
Humphrey	bay	20	by Sandbeck, out of Oceana, by Cerberus	started 46, won 16	won Stockton Plate	1	Diana	Wrawby, Brigg	Mr. J. Ashton	5 gs.
Idas	bay	13	by Liverpool, out of Marpessa, by Muley	started 24, won 13	won 2,000 Gs. Stakes	1	Hamlet	Melton Mowbray	Mr. Campion	
Idle Boy	chesnut	10	by Harkaway, out of Idle, by Sir Hercules	started 9	—	2	Mary	Ashton, Lancaster	G. Wood	10 gs., h. b. 3 gs.
Jason	brown	8	by Maroon, out of Juliana, by Partisan	never appeared	—	untried.	—	Cross-street, Finsbury, &c.	Mr. Lawes	6 gs., h. b. 3 gs.
Jericho	brown	13	by Jerry, out of Turquoise, by Selim	started 22, won 11	won the Port	1	High Priest	Newmarket	Mr. S. Rogers	10 gs., h. b. 5 gs.
Joe Lovell	bay	14	by Velocipede, out of Cyprian, by Partizan	started 6, won 3	won Great York Stakes	untried.	—	Burrough, Hendon	G. Rutherford	5 sovs.
John o' Gaunt	chesnut	17	by Taurus, out of Mona, by Partizan	started 38, won 23	won Newmarket S.	17	Hungerford	Oswaldkirk, York	R. Thorpe	5 sovs,
King Cole	bay	22	by Memnon, out of Baroness, by Leopold	started 70, won 27	won Chester Cup	3	Gratis	Berry Hill, Stoke-on-Trent	Mr. Parlby	10 gs.
Kingston	bay	6	by Venison, out of Queen Anne, by Slane	started 43, won 17½	won Goodwood Cup	untried.	—	Middle Park, Eltham	—	20 gs.
Knight of Avenel	chesnut	8	by The Doctor, out of Blue Bonnet, by Touchstone	started 6, won 4	won the Port	untried.	—	Ayglethorpe, Middleham		10 gs.
Knight of Gwynne	brown	8	by Gilbert Gurney, out of Seaweed, by Slane	started 17, won 5	won Newton St. Leger	untried.	—	Plompton, Harrogate	Mr. Groves	5 gs.
Lapidist	bay	6	by Touchstone, out of Io, by Taurus	started 6, won 1	won £70 at Newmarket	untried.	—	Esrick Park, York	Mr. Wilson	5 gs., h. b. 2 gs.
Launcelot	brown	18	by Camel, out of Emma, by Whisker	started 10, won 6½	won St. Leger	21	Portia	Holywell	Mr. Wetherell	8 gs.

STALLIONS FOR THE SEASON 1855—(*Continued*).

Name.	Colour.	Age	Pedigree.	Performances.	Principal Performance.	No. of winners out by.	Sire of	Standing at	Apply to	Price.
Leopold	chesnut	6	by Phlegon, out of Marinella, by Soothsayer..	started 7, won 2	won Ascot Vase	untried.	—	Mentmore, Leighton Buzzard	Mr. Markham ..	7 gs., h. b. 3 gs.
Libel, The	brown ..	13	by Pantaloon, out of Pasquinade, by Camel..	started 7, won 3	won Chester St. Leger..	7	Truth	Duddinghill, Willesden	T. Bullock.	10 gs., h. b. 6 gs.
Limestone	bay ...	11	by Touchstone. out of Decoy, by Filho-da-Puta	started 8........	—	—	—	Lane Paddocks, Sheffield	F. Croft	2 gs.
Longbow	bay ...	8	by Ithuriel, out of Miss Bowe, by Catton.....	started 21, won 13	won Stewards' Cup	untried.	—	Knowesley, Presscott .	T. Forshaw	10 gs.
Lothario	bay ...	15	by Giovanni, out of Moggy, by Sultan.......	started 22, won 6	won Liverpool Cup.....	3	Fuze	Duddinghill, Willesden	T. Bullock	5 gs.
Loup-Garou	brown ..	9	by Lanercost, out of Moonbeam, by Tomboy..	started 6, won 1	received £15 ft.	2	Coroner	Redlands, Reading	Mr. Lediard	10 gs., winners half price, &c.
Loutherbourg ..	brown ..	21	by Mameluke, dam by Smolensko	started 4, won 3	won Goodwood Stakes..	—	—	Horncastle, &c.	Mr. Beevor	5 gs., h. b. 3 gs.
Magnet, The	bay	13	by Camel, out of The Queen of the Vale, by Tarrare	started 15, won 11	won Granby Handicap..	untried.	—	Audlem, Nantwich	Mr. Lisle	5 gs., h. b. 3 gs.
Marley Hill	brown ..	4	by Melbourne, out of Mowerina, by Touchstone	started 4, won 1	won £220 at Newcastle	untried.	—	Skerne, Driffield	Mr. Stockdale ..	5 gs., h. b. 2 gs.
Maroon	brown ..	18	by Mulatto, out of Miss Giles, by Lottery.....	started 10, won 3	ran second for St. Leger.	—	—	Skerne, Driffield	Mr. Stockdale ..	7 gs.
Master Jack	brown ..	10	by Hillsborough, out of Miss Charlotte, by Turcoman	never appeared ..	—	untried.	—	Cross-street, Finsbury, &c.	Mr. Lawes	6 gs., h. b. 3 gs.
Mathematician ..	bay	9	by Emilius, out of Maria, by Whisker........	started 10, won 5	won Ebor Handicap....	1	Monge	Houghton, Stockbridge.	Mr. Scott.......	10 gs., h. b. 5 gs.
Melbourne......	brown ..	21	by Humphrey Clinker, dam by Cervantes	started 18, won 9	won the Palatine S.....	80	West Australian.	Cawston, Rugby	Mr. Black	50 gs. (35 mares)
Merry Monarch	bay	13	by Slane, out of Margravine, by Little John..	started 4, won 1	won the Derby	3	Old Rowney	Ham, Arundel	Mess. Weatherby	12 gs.
Meteor	chesnut	16	by Velocipede, out of Dido, by Whisker	started 2, won 1	won 2000 Guineas S.....	3	Spot	Lutterworth, Leicester .	Mr. Lucas	10 gs., h. b. 3 gs.
Mickey Free	brown ..	14	by Ismael or Irish Birdcatcher, out of Annie, by Wanderer	started 29, won 12	won Cleveland Cup	2	May Blossom ..	Kirkby, Tadcaster	Mr. Scott	6 gs., h. b. half price
Midas	chesnut	7	by Beiram, out of Merope, by Voltaire	started 25, won 9	won Newmarket St. Leger	untried.	—	Burghley, Stamford ..	Mr. H. Rose.....	10 gs.
Mildew	chesnut	8	by Slane, out of Semeseria, by Voltaire	started 21, won 10	won Ascot Vase	untried.	—	Easby, Richmond, York.	Mr. Jaques ....,	10 gs.
Moorcock	brown .	13	by Heron, dam by Young Phantom............	started 8, won 4	won a Plate	untried.	—	Knighton, Radnor ...	Mr. F. Griffiths..	5 sovs.
Mountain Deer..	bay	7	by Touchstone, out of Mountain Sylph, by Belshazzar.	started 20, won 6	won the Criterion	untried.	—	The Curragh, Ireland..	—	—
Neasham	bay	7	by Hetman Platoff, out of Wasp, by Muley Moloch	started 10, won 3	won Northumberland P.	untried.	—	Middle Park, Eltham..	—	6 gs., h. b. 3 gs.
Newcourt	bay	12	by Sir Hercules, out of Sylph, by Spectre	started 19, won 8	won Hereford Stakes...	untried.	—	Althorp, Northampton.	Mr. Elliott	10 gs.
Newminster	bay	7	by Touchstone, out of Beeswing, by Dr. Syntax.	started 10, won 2	won St. Leger	untried.	—	Tickhill Castle, Rotherham	Mr. Hornshaw..	10 gs.
Nutwith	bay	15	by Tomboy, dam by Comus...................	started 7, won 3	won St. Leger	15	Cobnut	Burghley, Stamford ...	Mr. H. Rose	30 sovs. (30 mares
Old Port........	brown ..	11	by Sir Hercules, out of Beeswing, by Dr. Syntax	started 4........	—	—	Mazella	Ongar Hall, Ellstree, Herts	—	5 gs., h. b. 3 gs.
Omroa	—	—	by the Arabian Gazelle, out of Young Duchess, by Walton.	—	—	untried.	—	New House Farm, Dunbar	Mr. Richardson	5 sovs.
Pelion..............	brown ..	5	by Ion, out of Ma Mie, by Jerry	started 16, won 8	won Eglinton Stakes....	untried.	—	Turf Tavern, Doncaster.	—	10 gs., h. b. 5 gs.
Phlegon	bay	15	by Beiram, out of Lucetta, by Reveller	started 6, won 2	won G. Duke Michael S.	8	Leopold	Burghley, Stamford. ..	Mr. H. Rose....	10 sovs.
Pitsford	chesnut	8	by Epirus, out of Miss Horwood, by the Saddler	started 26, won 9	won 2,000 gs. Stakes....	untried.	—	Duddinghill, Willesden.	J. Bullock	8 gs.
Planet	bay	11	by Bay Middleton, out of Plenary, by Emilius	started 9, won 4	won Molecomb Stakes ..	2	Donald	Roydon, Diss	Mr. Stannard ..	10 gs.
Pompey	brown ..	15	by Emilius, out of Variation, by Bustard	started 26, won 10	won Gt. York. Hand. (2)	7	Nancy.....	Burton Pidesea, Hull ..	Mr. Baxter	10 gs.
Pontifex	bay	8	by Touchstone, out of Crucifix, by Priam	never appeared ..	—	untried.	—	Great Driffield	Mr. Howden ...	5 gs.
Pottinger........	bay	11	by Plenipotentiary, out of Enterprise, by Defence	started 21, won 5	won £30 at Newmarket.	untried.	—	Wroughton, Swindon ..	Mr. H. Reeve ..	5 gs., h. b. 2 gs.
Poynton........	bay	12	by Touchstone, out of Lady Stafford, by Comus	started 6, won 2	won Great Yorkshire S.	6	Lady Vernon....	Box House, York	Mr. S. Reed ...	5 gs., h. b. 3 gs.
Pyrrhus the First	chesnut	12	by Epirus, out of Fortress, by Defence.........	started 13, won 10	won the Derby	8	Virago	Willesden Paddocks, Kilburn	Mr. Phillips	10 gs. (subs. full).
Ratan	chesnut	14	by Buzzard, dam by Picton	started 7, won 3	won the Criterion	11	Penang	Dean's Hill. Stafford..	Mr. Painter	7 gs.
Ravensbone	bay	9	by Venison, out Specimen, by Rowton........	started 1........	—	untried.	—	Theobald's Farm, Stockwell	Mr. Matthews ..	10 gs.
Ravenshill......	bay	6	by the Ugly Buck, out of Sylph, by Filho da Puta	started 2........	—	untried.	—	Harker Lodge, Carlisle	J. Ellringham...	7 gs., h. b. 2½ gs.

Rector	bay	—	by Defence, dam by Birdcatcher	a steeple-chase & trotting horse	—	untried.	—	Okeford, Dorset	Mr. Crew	2 gs.
Red Deer	bay	14	by Venison, out of Soldier's Daughter, by The Colonel	started 20, won 10	won Chester Cup	10	Timid Fawn	Holly Bank, Bacton, Needwood	R. Ridsdale	10 gs.
Red Hart	bay	10	by Venison, out of Soldier's Daughter, by The Colonel	started 16, won 8	won G. Duke Michael St.	2	Remnant	Leybourne, Maidstone.	Mr. Tweed	5 gs., h. b. 3 gs.
Retriever	chesnut	19	by Recovery, out of Taglioni, by Whisker	started 53, won 24	won Goodwood Stakes	11	Remunerator	Duddinghill, Willesdon.	J. Bullock	5 gs.
Robert de Gorham	brown	16	by Sir Hercules, out of Duvernay, by Emilius	started 20, won 7	ran second for the Derby	17	Hesse Homburgh	Ham, Arundel	Mess. Weatherby	20 gs.
Rochester	black	9	by Chatham, out of The Margravine, by Little John	started 17, won 5	won £275 at Newmarket	2	Cyrus	Fountain Inn, Bedford	Mr. Ward	6 gs., h.b. £2 5s.
Roland	bay	9	by The Saddler, out of Executrix, by Liverpool	started 15, won 2	won Wolverhampton S.	untried.	—	Plompton, Harrowgate	Mr. Groves	—
Russborough	chesnut	8	by Tearaway, out of Cruiskeen, by Sir Hercules	started 25, won 4	ran a dead heat for St. L.	untried.	—	Clifton, Nottingham	Mr. H. Neal	7 gs., h. b. 3 gs.
Safeguard	chesnut	23	by Defence, dam by Selim	never appeared	—	6	Agis	Longstock, Stockbridge	—	5 gs.
Saucy Boy	—	—	by Arthur, dam by Mameluke	a Steeple-chase horse	won the Caen St.-Chase.	untried.	—	Willesden Paddocks	Mr. Phillips	5 gs., h. b. 3 gs.
Selim	—	—	An Arabian	—	ran well at Calcutta	untried.	—	New House, Dunbar	Mr. Richardson.	10 sovs.
Sensation	brown	13	by Slane, out of Adela, by Emilius	started 8, won 1	won £50 at Bibury	—	—	Cherrydown, Chingford.	—	5 gs., h. b. 2 gs.
Siracol	brown	15	by Sheet Anchor, out of Nanette, by Partisan.	started 5	—	2	Tobolski	Prestbury, Cheltenham.	Mr. Ballinger	5 gs., h. b. 3 gs.
Sir Isaac	brown	24	by Camel, out of Arachne, by Filho da Puta	started 7, won 3	won Produce S. at Liver.	14	Yardley	Yardley, Birmingham.	Mr. Holloway	10 gs., h. b. 5 gs.
Sir Harry Martin	brown	6	by Lanercost, out of Miss Martin, by Voltaire.	never appeared	—	untried.	—	Catterick	Mr. Abbott	5 gs., h. b. 2 gs.
Sir Hercules	black	29	by Whalebone, out of Peri, by Wanderer	started 9, won 7	won the Claret	92	Faugh-a-Ballagh	Bushbury, Wolverhamp.	Mr. Phillips	11 sovs. (20 mares)
Sir Tatton Sykes	bay	12	by Melbourne, dam by Margrave	started 12, won 4	won St. Leger	4	Mr. Sykes	Theobald's Park, Enfield	Mr. A. Gray	11 sovs., h. b. £5 10s.
Slane	bay	22	by Royal Oak, dam by Orville	started 18, won 9	won Waterloo Shield	92	The Princess	Rawcliffe, York	T. Bateson	7 gs.
St. Bennett	brown	21	by Catton, out of Darioletta, by Amadis	started 33, won 11	won Northumb. P. (2)	5	St. Oswald	Darlington, Knaresbro'.	Mr. S. Waring	7 gs., h. b. 2½ gs.
St. Lawrence	brown	18	by Skylark or Lapwing, out of Helen, by Blacklock	started 58, won 25	won the Chester Cup	9	Surprise	Lowfold, Petworth	Mr. Scott	5 gs.
Stockwell	chesnut	6	by The Baron, out of Pocahontas, by Glencoe.	started 21, won 12	won St. Leger	untried.	—	Burghley, Stamford	Mr. H. Rose	30 gs.
Stone Plover	bay	5	by Cotherstone, out of The Wryneck, by Slane	started 1	—	untried.	—	Manvers Arms, Ratcliffe	R. Noon	6 gs., h. b. 3 gs.
Storm	bay	7	by Touchstone, out of Ghuznee, by Pantaloon	started 2, won 1	won £460 at Doncaster.	untried.	—	Knowesley, Presscott	Mr. Forshaw	7 gs., h. b. 3 gs.
Surplice	brown	13	by Touchstone, out of Crucifix, by Priam	started 16, won 9	won the Derby	untried.	—	Turf Tavern, Doncaster	—	40 gs. (30 mares)
Sweetmeat	brown	13	by Gladiator, out of Lollypop, by Starch	started 24, won 22½	won Queen's Vase	16	Mincemeat	Stanton, Shiffnall	Mr. Eyke	10 gs. (40 mares)
Swinton	bay	18	by Mulatto, out of Ringlet, by Whisker	never appeared	—	—	—	Wentworth, Rotherham	T. Honess	5 sovs., h. b. 1 sov.
Tadmor	brown	9	by Ion, out of Palmyra, by Sultan	started 11, won 8	won Gratwicke Stakes	untried.	—	Oakley, Bedford	—	5 sovs.
Tearaway	bay	17	by Voltaire, out of Taglioni, by Whisker	started 1[illegible], won 7	won the Madrids	24	Russborough	Duddinghill, Willesden	J. Bullock	8 gs., h. b. 6 gs.
Teddington	chesnut	7	by Orlando, out of Miss Twickenham, by St. Giles	started 18, won 10	won the Derby	untried.	—	Dean's Hill, Stafford	Mr. Painter	30 sovs. (20 mares)
Testator	brown	9	by Inheritor, dam by Muley	started 30, won 16	won Irvine Cup	untried.	—	Glasgow, &c.	Mr. J. Foster	5 gs., h. b. 3 gs.
Theon	brown	13	by Emilius, out of Maria, by Whisker	started 6, won 3	won Doncaster Two-yr. S.	15	Alcoran	Mentmore, Leighton Buzzard	Mr. Markham	17 gs., h. b. 3 gs.
Tim Whiffler	brown	11	by Voltaire, out of Frailty	started 18, won 8	won Tyne Stakes	untried.	—	Summer Town, Oxford	Mr. Beazley	5 gs., h. b. 2 gs.
Touchstone	brown	24	by Camel, out of Banter, by Master Henry	started 21, won 16	won St. Leger	137	Surplice	Eaton, Chester	—	20 sovs.
Touchstone (Yg.)	brown	5	by Touchstone, dam by Discount	never appeared	—	untried.	—	Hatherton, Crewe	Mr. Harpur.	7 gs., h. b. 3 gs.
Touchstone (Yg.)	brown	7	by Touchstone out of Ellipsis, by Emilius	never appeared	—	untried.	—	West Ashling, Sussex	—	5 gs., h.b. 2½ gs.
Triton	chesnut	13	by Glaucus, dam by Comus	started 14, won 4	won £55 at Exeter	untried.	—	Cherrydown, Chingford	—	2 gs., h.b. 1 g.
Turnus	bay	9	by Taurus, out of Clarrissa, by Defence	started 5, won 3	won Chesterfield Cup	untried.	—	Knockinill. Ecclefechan.	R. Menzies	5 gs.
Ugly Buck	bay	14	by Venison, out of Monstrosity, by Plenipotentiary	started 5, won 3	won 2,000 gs. Stakes	16	Ammonia	Berry Hill, Stoke-on-Trent	Mr. Parlby	5 gs.
Vatican	bay	9	by Venison, out of Vat, by Langar	started 27, won 11	won Newmarket S.	untried.	—	Hambleton, Thirsk	Mr. Stebbing	5 sovs.
Venison (Young)	bay	6	by Venison, out of Glee, by Touchstone	started 2, won 1	won £150 at Northampton	untried.	—	High Wycombe	Mr. Robinson	5 gs., h. b. 2½ gs.
Verulam	bay	22	by Lottery, out of Wire, by Waxy	started 1	—	22	Vulcan	Wodden, Cheltenhham.	Mr. Humphreys	6 gs., h. b. 3 gs.
Voltaire (Young)	brown	9	by Voltaire, out of Mecca, by Sultan	started 6	—	untried.	—	Murrell Green, Winchfield	Mr. Goddard	5 gs., h. b. 2 gs.
Voltigeur	brown	8	by Voltaire, out of Martha Lynn, by Mulatto	started 11, won 5	won the Derby	untried.	—	Angel, Catterick	Mr. S. Boone	12 gs. (40 mares)
Vortex	brown	6	by Voltaire, out of Martha Lynn, by Mulatto	started 3	—	untried.	—	Northampton	Mr. Merrick	7 gs.
Vitellius	black	13	by Ebberston, dam by Margrave	started 15, won 5	won Northampton Stakes	untried.	—	Thorpe-end, Melton Mowbray	Mr. Mason	5 gs., h. b. 2 gs.
Weatherbit	brown	13	by Sheet Anchor, out of Miss Letty, by Priam	started 8, won 3	won Four-year-old S.	9	Weathergage	Newmarket	Mr. Butler	15 sovs.
Weathergage	bay	6	by Weatherbit, out of Taurina, by Taurus	started 37, won 12½	won Cesarewitch Stakes.	untried.	—	Roydon, Diss	T. Stannard	10 gs. (full)
West Australian	bay	5	by Melbourne, out of Mowerina, by Touchstone	started 11, won 10	won the Derby	untried.	—	Ulleskelfe, Tadcaster	Mr. Scott	30 gs.
Windhound	brown	8	by Pantaloon, out of Phryne, by Touchstone	started 6, won 1	won £74 at Reading	1	Wandering Willie	Cawston, Rugby	—	10 gs
Windischgratz	bay	7	by Jeremy Diddler, out of Medea, by Whisker	started 13, won 2	won Goodwood Stakes	untried.	—	Rawcliffe, York	—	2 gs., d. of w. *gratis*
Wood-Pigeon	bay	13	by Velocipede, out of Amina, by Sultan	started 17, won 7	won Ascot Stakes	2	Dove	Burghley, Stamford	Mr. H. Rose	10 gs.
Woolwich	chesnut	8	by Chatham, out of Clementina, by Actæon	started 48, won 18	won Ascot Cup	untried	—	Roddicott, Banbury	Mr. Austin	10 gs.

THE VARIOUS MODES OF MANUFACTURING MANURES.

The readers of the *Mark Lane Express* must have been struck with the number of inquiries upon agricultural subjects with which its columns abound; and comparing them in point of number and intelligence with a bygone period, must feel convinced that a large portion of its readers now look forward to its columns for particular or general information upon subjects in which they are doubtless deeply interested.

In our last week's number a letter appears signed G. B. B., in which the writer informs us that he has a number of friends about to farm extensively or to take the management of estates upon their own account or that of others, " who are not a *little puzzled* as to what system to go upon when listening to the contradictory statements of our agricultural teachers ;" and he then proceeds to enumerate the various modes promulgated for the manufacture of manure, and also to recapitulate the processes resorted to by them, with a degree of acumen that convinces us he propounds the question more to introduce controversial discussion than for any particular information required by himself.

It is very true, as he observes, that any one entering upon farming without any settled principles of action would be greatly puzzled as to what mode to adopt; nor would we hold out encouragement for the future, feeling as we do that almost every farm in every district requiring some particular description of management, that every cultivator adopts some peculiar mode of management (which, of course, he thinks better than any other)—"riding his own hobby"—and hardly conceding to any one else the liberty of doing so likewise.

In adverting to the first inquiry of our correspondent, upon the manufacture of manure, we in the first place refer him to those articles which have appeared in this paper since the commencement of the current year; and we recommend him and his friends, desirous of obtaining information upon that subject, to read the standard works that have appeared upon agricultural chemistry and the composition of manures, with the best manner of estimating their constituent properties, and modes of application, rather than to pursue the " Will-o'-the-Wisp" fancies of the theoretical writers he alludes to. We shall therefore at once place before our readers, those systems of management we consider most conducive to that end.

In the manufacture of manure by the ordinary process of fattening oxen and by rearing neat stock, the main object ought to be to secure the fæcal deposits of those animals without loss, and to incorporate them with the fodder arising upon the farm, so as to become available for the production of the various crops for which they may become necessary. The addition of water during the process is essential to manufacture; the only point to guard against is having it in too large quantity. Every one acquainted with farming must have observed how greatly manure becomes deteriorated from the absence of sufficient moisture; the best stable and other manure is rendered worthless, if not duly saturated: it is the only mode by which excessive fermentation is restrained; and when properly consolidated by the weight of horses and cattle, manure it will remain for months together with very little change in its constituent properties; but so soon as it becomes removed and replaced, immediate fermentation takes place, and which is necessary to bring it into a suitable state for the production of crops, and for those of the vegetable class especially. This change, however, does not take place without some disadvantages, and, if carried too far, the loss of ammonia will follow to such an extent as to considerably reduce it in value. What the farmer has to guard against, then, is such an amount of loss that will more than counterbalance the advantage he seeks to obtain by its being rendered portable for his use. This he can effect by allowing it to remain as greatly compressed as possible until within a short time of applying it directly to his crops; and to secure this as much as possible, it should be covered over with mould several inches in thickness, until the external air becomes excluded as greatly as under the circumstances can be effected. Within a few days of its application to the land, it should be turned over and thoroughly incorporated, and, whilst in an active state of fermentation, applied to and immediately covered by the soil; and it will be better, to secure this object, to employ a lad with each plough, rather than allow any portion of it to become exposed to the action of the sun and air afterwards.

In other instances, the application is better made direct from the farm-yard to the field. Much expense is thereby avoided; and if the manure is carefully and quickly covered by the plough, all the manuring elements that it contains will be secured; but it must, at the same time, be borne in mind that regard must be always had to the description of crop for which it is required in making the application.

For the production of beans, peas, vetches, and oats, and for turnips and mangel-wurzel on clay land, if applied before Christmas, the long manure is most economical, and equally beneficial; whilst for every description of root-crop during the summer months, as well as for wheat, it should be more or less decomposed before application; and if reserved especially for the latter crop, it ought to be combined with an equal quantity of good mould immediately upon its being carried from the home-stall, and also entirely covered by the same material as before stated.

So far, we have stated the rational and practical application of manure, as adopted by the most skilful farmers. Chemistry teaches us, however, that our practice is not entirely in consonance with its precepts; but the farmer will always find a difficulty of bringing his chemical knowledge directly to bear constantly upon his farming practice: he is too much influenced by circumstances to adopt at all times that mode that he feels assured is the best. Upon his light turnip soils, the application of unfermented manure, in its partially dry state, under the influence of the sun and air, at midsummer, would certainly be the worst mode he could pursue, to ensure a plant of turnips; and his mangel-wurzel would also suffer to the same extent upon its application, unless, as before stated, the application had been made in the preceding autumn; but, since the application of guano, super-phosphate of lime and other substances have been applied for the production of turnips, the use of farm-yard manure has been greatly dispensed with, and it is now reserved for the grain crops and grasses, for which it is undoubtedly best adapted.

We feel that we may, to that portion of our readers who are thoroughly *practical,* be considered as taking great pains to inculcate principles thoroughly known and understood. To them we offer an apology, trusting that, when enquiry after enquiry appears in our columns upon this subject, that it will plead our excuse for trespassing at such length upon their patience. The observations of the correspondent we alluded to in the first instance confirm us that most persons who seek information in the present day are led astray by the conflicting opinions that are continually emanating from individuals whose only object is notoriety.

If the processes of farming could be carried out at all times under the same circumstances equally alike, then the manufacture and application of manure might be brought into competition with the manufacture and application of any other material; but when it is considered that the operations of farming are at all times interfered with by the natural elements and state of the soil, and that the machinery to carry them out will at some periods be inadequate to the amount of work to be performed within a given time, in such cases it must be apparent to the dispassionate observer that the farmer will be reduced to the necessity of adopting such means as will best secure and at the same time facilitate his object, without especial reference to the cost or economical application of the substances employed.

We are well aware that chemistry will be the safest guide in all matters of the nature we are discussing. To this we readily assent; but still there are practical appliances that do not in their results fully confirm that opinion, and to which we shall advert in our future observations upon this subject.

APPLICATION OF LIQUID MANURE TO THE ROOTS OF PLANTS.

Sir,—Your correspondent "A. C.," in the "Mark-lane Express" of the 19th inst., in answer to mine, previously published, contents himself, in the first place, by condemning me for the style and object of my letter; in the second, by endeavouring to show that I am wrong in two instances, in my description of Mr. Wilkins' system; and in the third, by introducing a contrast between that system and the experience gained by the Royal Society, by the growth of flax in Ireland, during the space of 12 years.

In answer to "A. C.'s" first objection, I would say that the assertion of "ill-natured opposition, manifested towards almost every person who ventures to develop anything contrary to old habits and prejudices," is just what I should expect from such a writer; for this is the great argument (?) which practically ignorant men are continually using wherever we refuse to *progress* in any direction in which they, in their wisdom, would drive us; and I have yet to learn that it is our duty "to hail as benefactors to humanity" those who stand forth as the inventors of a *patent* process of at least questionable merits, by which they hope to fill their own pockets. "A. C." must have a generous soul indeed, if he hail with gratitude the whole class of *patent* inventors.

"A. C." next says the land may be undulating or otherwise. In this I still beg to differ from him; for if the impervious tray bottom is perfectly level, and the ground lies in lands often much higher on the ridges than the furrows, it is obvious that without the land is laid level, when the impervious bottom is 18 inches below the level of the furrows, the plants growing on the ridges would be much farther from the liquid manure; and though by the force of capillary attraction the soil might be partially saturated, I submit that that saturation could not be nearly complete without great waste; and, therefore, the soil ought to be of the same depth throughout. In reference to the distance the tiles must be apart, whether, as I say, a foot, or as "A. C." says, about 18 inches, must depend upon the consistency of the soil through which the manure has to permeate.

The contrast furnished by "A. C," between Mr. Wilkins' experience during 2 years, and that of the Royal Society during 12 years, proves nothing but *the difference* between the two, without showing its superiority to agriculture in general, in the production of the principal food of man. What we want to see proved is that we can produce corn crops cheaper under this system than any other, which it professes to do, or how can it "make England independent of all nations for the necessaries of life"? When this is done, that "selfishness which is too prevalent amongst farmers" will vanish, and we shall be most happy to "encourage Mr. Wilkins to go on with his project by giving him a helping hand," by hailing him as a benefactor to humanity, and by what will be more tangible—paying him handsomely for his *patent* invention.

A great deal more might be said on this subject; but I am unwilling to trespass upon your valuable space, and would therefore conclude by reminding "A. C." that his letter has fallen far short of its object, if it was intended to controvert my view of Mr. Wilkins' knowledge of his subject, as "A. C." fails to prove that Mr. W.'s calculation of expenses is not 100 per cent. less than they in reality would be.

I am, Sir, yours, &c., S. S.

THE NEW CATTLE MARKET AND THE SABBATH.

From the interest which this subject is exciting in the public mind at present, let us take a prospective glance at the working of the New Cattle Market on Sunday, in order to ascertain how far it will correspond with that of the Old. Opinion is a good deal divided on the topic, some apprehending that the Lord's Day will be as much desecrated in the one case as it has been in the other; some, the contrary; while others prophesy that the speculation will be a failure, and that the carcase trade will soon supersede the live stock.

There are here, it will be seen, several important practical questions not very easily disposed of satisfactorily. This arises from the probability of much truth being involved in each of them; for there can hardly be a doubt but those who now pay no attention to the sanctity of the Sabbath will continue to do so, if they are allowed; while it is equally plain that characters of this kind will be slowly removed from the New Market, owing to the improvements in the details of management. The carcase trade, again, is already fast superseding the live stock, and, as it has generally been foreboded by both sides of the trade that the removal of the market from Smithfield would increase their demands on Newgate and Leadenhall, the result is obvious.

A fourth question has been raised as to how far these things would be realized under a change of market-days. It has been said, for instance, on the one side, that to change the Monday market to Tuesday would not only increase the sales of Friday, but relieve Sunday of a vast amount of labour; and on the other, that such a change would give a tenfold stimulus to the carcase trade, thus putting an end to the New Market at no distant date, with, of course, also the desecration of the Sabbath.

From this general view of circumstances, it would appear that the Sabbath is not to be in greater danger, so far as mere labour is concerned. And this is no more than in accordance with the spirit of the times; for, although there is too great an inclination for pleasure-hunting on the Lord's Day, and amusement of every kind, yet there is a general determination to give that day to the labouring man as one of rest in every province of the kingdom. This may be instanced by the early closing of shops on Saturday, &c., &c.

When the facts of the case, however, are more closely examined, it will be seen that the Sabbath may be more in danger at first, if the necessary steps are not taken to afford it protection. There is still a large class of persons, for instance, in the British capital who would prefer 3s. 6d. any day to a sermon; while there is another class who would rather pay this sum than lose the profits of their lairage, or even turn from the beaten track in which they have hitherto moved; both of whom will have their Sunday labours increased in attending the New Market, if allowed to follow the practice they now pursue. In a few cases near the New Market the amount of labour might no doubt be less, provided parties were religiously disposed to venerate the Sabbath; but, so long as £ s. d. only are worshipped, we fear the question of religion becomes a negative one with them also personally, while no more respect will be paid to the hallowed rest of others, or the public generally, than at present. For example:

Almost every Saturday forenoon we meet, between ten and eleven o'clock (A. M.), in Blackfriars-road, when going to town, a large drove of cattle from Euston Station, or the King's Cross terminus, on their way to lairage on the Surrey side of the river. Now, as some of the salesmen, in their evidence before Parliament, stated as their opinion that cattle were all the better to get their legs stretched by travelling thus to distant lairs (as if they had sat, as they themselves do, in a cramped position on a hard seat)! the probability is, that they will continue the practice, however objectionable it may be in reality; consequently, when the market is removed to Copenhagen Fields, they must start sooner, which would just be taking so much off Sunday, to cover the extra distance. It will thus be seen that both the drover and salesman will be more employed on Sunday than at present, so long as this absurd practice is allowed to be followed, while the public along the streets will be more annoyed.

That this absurd practice will be put down, is manifest; but its accomplishment is a work of some time. However promising, for instance, the lairs of the New Market may be, their success depends entirely upon management; and some considerable experience is necessary in order to enable farmers and salesmen to pronounce a satisfactory verdict here. Hitherto the Corporation of London have unfortunately not exhibited in their conduct much acquaintance with the modern management of fat stock; and the construction and subdivision of the new lairs do not argue much more favourably for the future. This, no doubt, arises to a certain extent from the prejudices of the trade flowing in so strong a current against them—prejudices which must always be respected; but difficulties of this kind will slowly disappear before the progress of science, enabling the Corporation to alter the lairs, and, indeed, the whole system of marketing, the moment the market is removed. We might quote a thousand analogous examples in proof of this, were it necessary.

A very important responsibility will here devolve upon the Press, and *upon none more than the "Mark Lane Express," the principal agricultural market paper in the kingdom*. The conduct of the Corporation, no less than that of salesmen and the trade generally, will have to be narrowly watched, and parties goaded into the path of duty with promptitude and impartiality whenever they are found astray. In a case of this kind, where principle and improved practice are involved, neither can be spared, for both must immediately lay aside antiquated systems, and join in the march of progress.

On the part of the Corporation, they will be very differently situated in the management of the new market from what they were under the old. At present they are almost independent of Parliament, but it will not be so the moment the market is removed; for, according to the 28th and 29th sections of the statute, they will have annually to lay a report before Parliament, when their conduct will be subject to review. Under such circumstances they will consequently endeavour to avoid reproof.

With regard to the driving of fat stock from under the gates of the new cattle market to the opposite side of the capital, through some eight miles of crowded thoroughfares, such a practice will soon be put a stop to the moment the new lairs of the market commissioners are successfully opened. On this point there need not be two opinions, for we have only to bring under the notice of farmers the treatment which their cattle thus receive, when they will briefly put a stop to all antiquated practices of this kind. Salesmen, therefore, on the south side of the river, or similarly situated, will do well not to lose sight of their commissions in grasping at long rents for their lairs. Those of them who have lairage grounds can easily appropriate them to building purposes; and the sooner they look after their interest in this respect so much the better, for depend upon it Parliament will never teach farmers that driving their fat stock through some sixteen miles of the crowded thoroughfares of the English capital will either increase the weight or improve the quality of their butcher-meat, nor even submit to be told so by the Corporation.

On the second question the *Mark Lane Express* has already said so much, both in its leading and other columns, that it would be superfluous to say more. It has, for instance, already shown that management in the new market will be superior to that in the old, and subject to further improvement—that the circumstances of the trade, including drovers, will be morally and physically elevated—that the interest of buyer and seller requires a sufficiency of lairage for the whole stock within the market grounds—that stock will be delivered within the grounds directly from the railways—that stock for the Monday market should be placed in the lairs on Saturday, so as to have the intervening period to rest and recover themselves from the fatigue of their journey, and be fit for standing the market—and that this would reduce Sunday labour to its minimum; and, therefore, we shall not add a single sentence more at present.

Regarding the carcase trade, there cannot be a doubt but it will eventually supersede the live-stock. This is almost the unanimous opinion of the trade, both farmer and butcher; so that the difficulty lies in accounting for the slowness of the change. Every intelligent grazier is aware that when he sells a fat ox or sheep a large proportion of its weight is given away for nothing, and that the part thus given away is invaluable to himself, though worse than useless to the purchaser. It is difficult to estimate correctly the loss thus sustained, but in the metropolis alone it amounts to the value of thousands of tons annually of Peruvian guano; so that if the general waste were applied to the soil it would yield an increase of produce equivalent to nearly the whole rental of the kingdom! And he is not only aware of this, but also that a very serious waste is sustained both in the quantity and quality of butcher-meat during marketing, and that the live-stock trade is attended with a greater expense than the dead-meat. Now, however slow may be the effect of such circumstances at present, their force ultimately must carry everything before them.

That the carcase trade interferes less with the hallowed rest of the Sabbath is a proposition too manifest to require proof. And as it would also greatly improve the sanitary state of all our manufacturing and commercial towns were it generally reduced to practice, it would consequently prove a double blessing to them, and therefore merits more support than it receives, either at their hands, or those of farmers.

That the removal of the market will give a stimulus to the carcase trade, and facilitate the downfall of the live-stock, is also a proposition which has met with the general countenance of the public and the trade, both buyer and seller, as already stated. Live-stock salesmen will no doubt have the improvements of the new market in their favour, *provided they embrace them;* but unfortunately, these are not what they might have been, nor what the modern management of fat-stock requires. In this respect, public interest has been sacrificed to the prejudices of the trade! and the interest of the proprietors of private lairs consulted (?) *Not a single lair, for instance, has been erected fit for stall-fed or box-fed cattle!* while the yards and sheds for out-door fed stock are worse in principle than those of private lairs, from their being closely placed together; the herd in one yard not only being disturbed in entering and removing stock, but the herds in the yards through which such stock are driven! Had there been a private communication from the outside to each yard, then salesmen would have had several inducements to place their stock in them, from their proximity to the market, and superior mechanism; but as it is, they are obviously encouraged to drive them to their own lairs, however distant, as on the south side of the river, and of course drive them too on Sunday night in return to the market.

But this is not the worst feature of the new lairs—*that most calculated to effect the desecration of the Sabbath*, and sacrifice the interest of the farmer, for we question if our readers will be willing to credit what we are now to announce. Strange as it may appear, for example, yet such is fact, that the lairs of the New Metropolitan Cattle Market erected in 1855, by the CORPORATION OF LONDON, are constructed to *herd together in one yard, horned cattle and polled cattle of all breeds and sexes!* Only let our improved breeders and feeders meditate for a little on this, and then think of the march of progress in the British capital. Were we to suggest an experiment on their part at home, doubtless the next breath would send us to the House of Correction; yet such is the treatment their improved breeds of fat-stock are to experience in Copenhagen Fields. Their soft and docile short-horns, for instance, accustomed to lounge and ruminate at ease in feeding boxes, undisturbed by other beasts, are to be turned into the same yard with fierce and savage horned "Scots!" while bulls and cows, home and foreign, are to be wedged into the same herd, so long as practicable.

Now what is the remedy practically proposed to redress such grievances? Nothing less, nothing more than the change of market days! our fourth and last proposition. Hitherto the management of cattle in the metropolis has been entrusted to a class of drovers who pay, generally speaking, no attention to the duties of the Sabbath, or the sacred privileges which others enjoy. The character of the work is such that none else would accept office but the offscourings of society, who, instead of wishing better, appear to rejoice in Smithfield with all its associations as their natural element. But the age of "ring-droves," goads, vociferous dogs, and Donnybrook anathemas in the management of fat-stock, is gone by in the provinces. Hence a corresponding remedy is wanted in the capital.

What the agricultural interest or seller wants is simply this—accommodation for fat stock in accordance with the progress of modern science, which may be found noticed in any agricultural work. Take Morton's Cyclopedia of Agriculture, for instance, just published, where the article "Smithfield" will show it—an article which points out the remedy in question—one on which there is no division of opinion among intelligent practical farmers. Now, had the accommodation there recommended been made—Shorthorns, Herefords, Devons, Scots, bulls, cows, &c., would have each been provided for according to their respective wants. Ditto, ditto, sheep, calves, and pigs, and their management entrusted to a different class of men—cattlemen, and shepherds, who could have entered their different consignments in their respective boxes on Saturday without a dog, goad, or oath, fed them on Sunday, attended church or chapel as regularly as their pastors, and been up in time on Monday morning to perform their own morning devotions before feeding and tying up stock for sale. All this is practicable—being no more than the counter-part of what we ourselves and our cattlemen and shepherds have from the one year's end to the other performed when farming. Such is what farmers require for their fat stock, and what they have undoubtedly just reason to expect; and this is just what the capital herself wants to prevent, the desecration of the Sabbath.

The impossibility of a change of market days securing the observance of the Sabbath may be thus shown. The droves of cattle which we now meet on Saturday, for example, we should then meet on Sunday about church-going time! Smithfield drovers have generally other employments; and from their character, we fear, would prefer driving on Sunday to Saturday; and the frightening of the aged and infirm who venture out to church on that day would only prove a source of mirth to them; while salesmen who have lairs of their own would not naturally feel disposed to lose a single night's rent: hence the consequence. In the country, again, the increased desecration of the Sabbath would be tenfold worse; for the retirement of every rural village would be thrown into an uproar every Sunday by cattle going to railway stations. We all know how wild fat housefed animals are when first turned out; how anxious farmers are to prevent them from doing harm to themselves or others, and how sincerely their servants respond to their wishes on such occasions; consequently we should have the whole rural population involved in the desecration of the Sabbath by the change of market-days, without in one iota mitigating the evil in the capital.

There is another practical view of this absurd remedy which we must not overlook, viz.—*£ s. d.* Change the market-days, for instance, and what, on the one hand, will be the increased demand on Monday in Newgate for beef and mutton? and what the increase of price? and, on the other, what the reduction of demand in the new market on Tuesday? and what the decrease of price? These are plain practical questions, and from what we have already said of the carcase trade, we may safely leave our readers to answer them at their leisure. Every one in the least acquainted with the butcher trade of the capital must be aware that Monday is peculiarly adapted as a market-day for it, and that a sacrifice here must be balanced by a corresponding result. To involve farmers and their servants in one general desecration of the Sabbath, and to reduce the price of stock some 20s. per head at the same time, without (as we have already said) in one iota mitigating the evil complained of in the capital, would be in the highest degree impolitic.

Such are the observations proposed on this all-engrossing subject. Successfully or not, we have endeavoured to give them their proper place, and respectfully bring them under the notice of her Majesty's Secretary of State and Cattle-market Commissioners; the Lord Bishop of London and deputation, who lately had an interview at the Home-office; "the Society for Promoting the due Observance of the Lord's-day"; and the readers of the *Mark Lane Express*. However imperfectly treated, the several circumstances instanced will bear any amount of investigation. The desecration of the Sabbath at present is involved in the mismanagement of fat stock in Smithfield; and to perpetuate that mismanagement in the new market is neither more nor less than an absurdity too gross to be seriously entertained by agriculturists, before whom the whole facts of the case stand forth unveiled in bold relief. The practical question at issue is to bring the commerce of fat stock in the British capital within the pale of modern science, and to control it there during the six days of the week as other branches of trade are controlled, placing the management of fat stock on the seventh in the hands of Christian men, God-fearing cattlemen, and shepherds, who, while they discharge their temporal duties, will neither forget the assembling of themselves together, nor their obligations to a Christian public.

THE PATENT OFFICE, AS AVAILABLE TO THE PUBLIC.

The Commissioners of Patents on Monday, March 5, opened a reading room, in connection with the Great Seal Patent Office, which promises to be of the highest importance to those of our readers and the public interested in the progress of chemical and mechanical science. It is here the correspondents of the metropolitan press will not only have the privilege of examining the specifications of patents as they are printed and published, and extracting therefrom whatever suits their respective columns, free of expense, but also of going retrospectively into the whole subject of invention since 1617—tracing the progress of those sciences, and bringing to light no doubt many a useful discovery which inventors were unable successfully to bring before the public, owing to the prejudices of the times and the enormous expense of procuring patents. The reading room will also be open on the same liberal terms to implement makers, engineers, manure manufacturers, patentees, and others, who may wish to examine any invention which peculiarly interests them. We ourselves have oftener than once had occasion "to make a search" under the old statute; and when we look back to the different offices visited, the fees mulcted from us at every step, and the vexatious disappointment generally experienced after all, we have ample reason to thank the above functionaries for the successful manner in which they have discharged their duties in this department of the administration of their office.

In another column will be found a review of the chronological, alphabetical, subject matter, and reference, indexes of patents and patentees from 1617 up to the present time, which will help to illustrate the usefulness of this department of the Patent Office, whose object is the publicity of specifications and the progress of science under its control.

And besides laying open to the public these indexes, and the works to which they refer, the Commissioners themselves have prepared an invaluable series of specifications and drawings on reaping machines, from the earliest period on record up to 1853, and another on fire-arms and projectiles, &c., from 1718 up to the same period, in nine large volumes. This, as may be supposed, is an extremely interesting work; while others are in progress on the "consumption of smoke,"—"sewage tiles,"—the "propelling of ships,"—the former two at the request of the Secretary of State (Lord Palmerston, when in that office), and the latter of the Board of Admiralty. Beyond this, the Commissioners have in contemplation the exchanging of Patent Office Publications with the United States of America and the different States of the continent of Europe; so as to bring within the Patent Office Reading Room of the metropolis the universal rise and progress of invention. In glancing at such a work of reformation, the mind at first is almost at a loss to comprehend its magnitude, or the advantages it is calculated to confer upon us.

The printing of "specifications," "disclaimers," and "memoranda of alterations," with the lithographing of drawings, and supplying the public with them at cost price, forms a very interesting feature, and one that cannot fail to prove equally advantageous to patentees and the public. Under the old statute, how many projectors were never able to bring the merits of their inventions before the public! while of those who were able to do so, how many were ruined in defending them afterwards! and how few are there of them who have realised fortunes by patents! On the contrary, the Patent Office and the press will now bring the merits of every invention before the public, while the machinery employed in doing so will almost prevent the possibility of litigation. In short, under the old statute the inventor and his invention were consumed by lawyers and agents! while under the new he has the satisfaction to know that the greater part of the money he pays for his right goes directly towards the bringing of its merits before the public.

Results have already proved how beneficial the change has been to the public. First, the advantages arising from the union of science and practice so familiar to the ear are now being rapidly realized in the progress of chemistry and mechanics. The printed specification of an invention, such as a reaping machine for instance, or any patent manure, can now be obtained by remitting a few postage-stamps to the office, with the name of the patentee, title, number, and date of his invention. Then, again, since the passing of the statute of 1852 upwards of five thousand specifications have been printed, each forming a distinct proposition by itself, and the whole a very interesting thesis for study. Into details here both time and space forbid us to enter at present: suffice it to say that the interest of our readers is fairly represented in the publications of the Patent Office, for these demonstrate in the most satisfactory manner that the English farmer is making good progress in chemistry and mechanics.

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JEAN BAPTISTE AMBROISE MARCELIN JOHARD, 4, South-street, Finsbury, London, Director of the Museum of Industry, Brussels—"Pumps," No. 1746; date, 1854—price 6d.

THE BEST LOTHIAN FARMERS, AND THEIR EXPERIENCE OF ITALIAN RYE-GRASS.

A report of the discussion on rye-grass cultivation, which took place before the London Farmers' Club, will be found in to-day's publication. *If Italian rye-grass is only to be cultivated by itself, and its growth stimulated by irrigation, or rather liquid manuring, as the resolution of the Club bears, there is little probability of its being more generally cultivated.* The chief value of Italian rye-grass, in our opinion, is to sow along with clover in the regular rotation of the farm, and to occupy the place of a part or the whole of the common rye-grass, now all but universally grown in Scotland. *The experience of some of the best farmers in East Lothian, however, is against the growing of Italian rye-grass, they having some years ago cultivated it in place of the common rye grass, and as a mixture with it. The most of those have now abandoned it*—we think, however, somewhat prematurely. Thinness of plant was generally complained of. Where grass is grown for soiling, it possesses the great advantage of coming again in the second crop of clover; whereas common rye-grass is only available in the first crop. Stock also prefer Italian rye-grass, whether in a green state or made into hay, to common rye-grass. Besides, one of the great advantages of Italian rye-grass is, that it comes early in spring and grows late in autumn, thus affording food for sheep stock at a season when its value can scarcely be estimated, particularly in backward springs. We feel confidence, therefore, in recommending farmers generally to substitute Italian for fully one-half of the common rye-grass in the ordinary rotation; and where the land is very rich and the grass to be used for soiling, the Italian can be advantageously substituted in whole for the common rye-grass—of course the usual portion of clover being sown along with it. The objection of thinness of plant can only be partially overcome by thick seeding. Italian rye-grass produces a great bunch of roots, and thus the roots occupy more ground than the common varieties. We direct special attention to the very elaborate and carefully drawn up paper of Mr. Morton's, who appears to have expended a great deal of time and attention in gathering information in reference to the growth of this plant. Of course, we differ from his opinion with regard to the advantages of liquid manuring under common circumstances, *and also, that the practice of an isolated farm or two in Ayrshire should not be taken as a safe guide for that of farmers generally.—North British Agriculturist.*

AGRICULTURAL REPORTS.

GENERAL AGRICULTURAL REPORT FOR MARCH.

During the greater portion of this month the weather was extremely variable, and far from favourable to field labours. Vegetation in general was very backward, even in the most forward parts of the country; yet our accounts, as a whole, are somewhat cheering. The fineness of last autumn enabled our farmers to sow more than the usual breadth of land with wheat; and notwithstanding the extreme severity of the weather during the winter months, the plants of this description of produce are represented as strong and healthy in almost all localities. On this head, therefore, there is nothing to complain of; but an immense amount of field work has to be got through between this and the close of April. Unquestionably, this is likely to be a backward spring; yet, with fine weather, we see no reason to apprehend either scarcity, or the cutting of wheat being prolonged beyond the usual period. The land is represented as in excellent condition, and great preparations have been made for the sowing of barley and all other spring corn.

Although fluctuations have taken place in the value of grain, the corn trade has continued in a healthy state, and prices have kept up; but, by this time, very great inroads must have been made upon the crop of 1854, and which, sooner or later, must have their accustomed influence upon price, unless, indeed, we are to have a speedy peace with Russia. Such an event would completely change the aspect of the trade, and possibly cause a sort of panic in it. We ourselves are not so sanguine as to the result of the present Congress sitting at Vienna as some parties appear to be, because we are perfectly satisfied that, unless under compulsion Russia will never give up her designs upon the Ottoman Empire.

A statistical return, just issued, gives us a clear insight into the transactions in grain, &c., in 1854. It appears that we imported 4,473,085 qrs. of wheat in that year, against 6,635,820 ditto in 1853. The quantities of English wheat disposed of were 3,913,257 qrs., against 4,560,912 in the previous year. Thus we find that the total imports and sales were 8,386,342 qrs. in 1854, and 10,796,772 in 1853. The average price of wheat, last year, was 72s. 5d.; of barley, 36s.; and of oats, 27s. 11d. per qr.

There is one feature requiring particular notice at this time, and which has, evidently, checked any serious advance in the price of wheat, viz., the immense supplies of potatoes, in the best possible condition, which have appeared on sale this month. When we consider that scarcely any imports have taken place from the continent for several months, and that a very large consumption has been going on, it is quite evident that an unusually large supply was produced last year. This is a point to which we have before directed attention, and for which we have contended, in spite of the numerous reports which have reached us to a contrary effect. The stocks on hand are still seasonably large, and it is tolerably evident that a portion will shortly become useless for human consumption.

The wool trade has continued in a most depressed state. English qualities have with difficulty sold on lower terms, and a further decline in value is anticipated. Shearing has been generally commenced, and the result, as yet, is that the supply is unusually large. The importations from abroad and our colonies have been tolerably good; but the next public sales in London are not expected to be extensive.

The prospect held out of a peace with Russia has had great influence upon the Tallow market. Compared with the same time in 1854, the price of tallow has given way £20 per ton—the present value of Y. C. being 48s., against 68s. per cwt. This decline has acted against the price of rough fat, which is now 2s. 6½d., against 3s. 7d. per 8lbs. last year; whilst the stock of tallow in London is 35,456 casks, against 35,803 ditto in 1854. This is a remarkable feature, considering that we have received only 68,317 casks, or 15,000 casks less than in corresponding periods; but the deliveries have fallen off from 96,442 casks to 67,730 casks. These figures show that we have consumed nearly 45,000 casks less than our usual supply, taking the period from the 1st of June in each year. But this deficiency has been *more* than made good by the increased production of home, or rough fat; and the late high prices of tallow induced housekeepers generally to use cheaper and, possibly, better substitutes. The decline in the value of all Russian produce shows us that we have now found out the means of becoming almost wholly independent of that country for supply.

The manure trade has been active, and the whole of the guano as it arrives is immediately sold for use. The quantity now on passage is about 70,000 tons; but a large portion of it will not be here till the latter end of May. Large quantities of Mexican guano have come in from New York, where it had been lately selling at from £6 to £8 15s. per ton.

With some few exceptions, the seed trade has been inactive. The large imports of linseed from India have had the effect of causing a reduction in the price of that article; but cakes have mostly sold on former terms. The increase in the growth of linseed in India is enormous; and it threatens to destroy the whole trade of the Baltic and Black Sea.

The lambing season has passed off well, with comparatively few losses, notwithstanding the severity of the weather.

Both hay and straw have been in plentiful supply; and about an average business has been doing, as follows:—Meadow hay, £2 15s. to £4 15s.; clover ditto, £3 to £5 15s.; and straw, £1 3s. to £1 9s. per load.

REVIEW OF THE CATTLE TRADE DURING THE PAST MONTH.

Although the cattle trade, during the greater portion of the month just concluded, has not been to say brisk, it has been decidedly healthy; and prices generally have kept up remarkably well. That the consumption of meat has increased to some extent, is evident from the comparative readiness with which clearances have been effected. There is one feature deserving particular attention—viz., the fine condition in which live stock has appeared on sale in Smithfield. For some years, a great falling off has been observed in the weight and condition of both beasts and sheep; but since the commencement of the present year, those descriptions of stock have not only "died" well, but they have been almost wholly free from disease. This is a great point in favour of grazing; and it reflects the greatest credit upon the Norfolk graziers. Our readers will recollect that, during the last six months of 1854, the arrivals of stock from our northern grazing districts were miserably poor; indeed, at least two-thirds of them were almost beneath the middle quality, so far as good cutting properties were considered. The cause of the falling off in weight we have already alluded to; but it is quite clear that the men of Norfolk have been eminently successful in providing food of the best kind for the metropolis. The question has been asked, Has the large outlay for artificial food been repaid? We think that we have only to refer to prices to confirm the opinion that oilcake, though dear, was never more advantageously used than during the past twelve months. Again, the beasts have arrived, in a general way, quite from nine to twelve months *older* than in the general run of past years; they have, consequently, shown out their good points; and there has been less hesitation on the part of the butchers in making purchases. Consumers have been more satisfied with the joints forwarded to them, notwithstanding their high value; and a point has been gained—and for which we have long contended—calculated to have great influence upon the future course of the trade—that is to say, if the system be generally followed out. Not that we anticipate low prices from either beasts or sheep becoming more aged; but we contend that the graziers will, from the remunerative prices at which they will be sold, not be disposed to force off their stock, and thereby diminish their means of enriching the land.

On the whole, the stock has fared well, though in some parts of England the supply of winter-food is now nearly exhausted.

The re-opening of some of the Dutch ports has increased the imports of foreign stock into London, compared with the preceding month; nevertheless, they have been small, the time of year considered. The arrivals have been as under:—

	Head.
Beasts	1,512
Sheep	135
Calves	456
Total	2,103
Corresponding month in 1854	8,409
— 1853	10,884
— 1852	6,747
— 1851	8,381
— 1850	6,004
— 1849	8,034
— 1848	4,421

Our correspondents in Holland state that very large supplies of beasts, sheep, and calves will be shipped to this country during the spring months; but they entertain the opinion that there will be very little addition in their weight. This deficiency, however, is by no means a matter of difficulty as regards sales, which are invariably quicker than those of our best stock.

The total supplies of stock in Smithfield have amounted to:—

	Head.
Beasts	18,644
Cows	380
Sheep	88,790
Calves	835
Pigs	2,765

COMPARISON OF SUPPLIES.

	1852. March.	1853. March.	1854. March.
Beasts	18,699	19,228	20,588
Cows	448	360	532
Sheep	100,465	85,680	93,060
Calves	1,280	1,614	1,091
Pigs	2,629	2,780	2,780

The arrivals of beasts from Norfolk, Suffolk, &c. have amounted to 9,209 Scots and short horns, from other parts of England 2,580 of various breeds, and from Scotland 1,180 horned and polled Scots.

Prices have ranged as follows:—

	s.	d.		s.	d.
Beef at from	3	4	to	5	0
Mutton.................	3	4	to	5	2
Veal...................	3	10	to	5	4
Pork..................	3	2	to	4	4

COMPARISON OF PRICES.

	March, 1852.					March, 1853.					March, 1854.			
	s.	d.		s.	d.	s.	d.		s.	d.	s.	d.	s.	d.
Beef ..	2	4	to	3	8 ..	2	8	to	4	4 ..	2	10	to 4	8
Mutton	2	6		4	4 ..	3	10		5	4 ..	3	2	5	2
Veal ..	3	4		4	6 ..	3	4		4	8 ..	4	4	5	8
Pork ..	2	6		3	10 ..	2	10		4	0 ..	3	4	4	10

As regards lamb, it has hardly come into season. Prices have ruled from 5s. to 5s. 8d., in some instances up to 6s. per 8lbs.; but there have been very few fine qualities on sale. Last year, Down lambs were worth 6s. 8d. to 7s. per 8lbs.; but this season the market has been almost wholly supplied from Dorsetshire and the Isle of Wight. The depressed state of the wool trade has been productive of a small range between the value of shorn sheep and those in the wool—the difference being only 6d. per 8lbs., or 2d. per 8 lbs. beneath the ordinary run of years.

Newgate and Leadenhall have been moderately well, but not to say largely supplied with both town and country killed meat. About an average business has been transacted at our quotations. Beef, from 3s. 2d. to 4s. 6d.; mutton, 3s. 4d. to 4s. 8d.; veal, 3s. 8d. to 5s.; and pork, 3s. to 4s. 6d. per 8lbs. by the carcass.

CALENDAR OF AGRICULTURE.

The sowing of grain must be quickly finished, if any oats and barley remain to be sown; sow lucerne and flax seed, and apply top-dressings of artificial manures. Sow grass seeds on barley and wheat tilths, use light harrows, and roll heavily. Finish the preparation of grass and meadow lands.

Towards the end of the month sow mangel wurzel by machine on drills 28 or 30 inches apart, on lands well pulverized and dunged; steep the seeds in weak solutions, encrust, and dry it with quick-lime for sowing. Plant potatoes on lands well prepared, dunged, and drilled, 30 inches apart; use strong sets newly cut, very "moist" manure, and in a large quantity; plant and cover quickly, and roll down the drills. If the land be limed, use at least 200 bushels to an acre, hot as possible, secured in a thatched heap from the previous summer and autumn. If the lime be near, it may be carted to the field from the kilns, powdered, and immediately applied; or, if time can be obtained, spread the hot shells, broken very small, evenly on the land, and the subsequent workings will cover it, when the land will be benefited by the moist heat and damp exhalations evolved during [illegible]olution. This method is less expensive, but [illegible] an early application.

Horse and hand-hoe all early-drilled crops (as wheat, beans, lucerne, and carrots) as may be required. Begin in time, and allow no weeds to grow.

Pare and burn rough lands for turnips and rape. Place the sods in convenient heaps, and burn moderately, to avoid extreme calcination. This method of burning is by far the best known for reducing and bringing into cultivation the surface of waste lands containing much inert, liqueous, and fibrous matter.

Burn into ashes for the turnip drill peaty substances, turfs, and dry earths.

Early vetches, rye, winter barley, and watered meadows will now be ready for ewes and lambs and fattening animals. Cut and put the food into racks, and fold the animals nightly on the mowed ground—two nights on a space, and two square yards to each sheep. Fold in the same manner in good weather during all seasons of the year on thin bare lands of any kind, grass or arable: this is a great improvement, and not the least recommendation—a cheap one.

As the days are lengthened, animals of every kind require more food, and the weather being drier, the more succulent the better. Supply milch cows liberally, either in the steamed or natural condition, or both; suckle the calves twice a-day at least; spare not trouble or expense—the animals will repay. Attend to store and fattening animals in the same manner; use swedes, beet, and oil-cake; all dry substances should be made moist, as chaff and the meals of grains; without juice, fattening goes on slowly. Give suckling calves in the pens some of the earliest green food, also bruised cake, linseed jellies, beans and barley meals to push them forwards, and to prepare them to live without milk or grosser substances.

Lambing will be busy during this month. Feed the great ewes regularly and abundantly with juicy food, attend carefully to the young lambs for shelter and comfort, and remove the strongest to early meadows and clovers. In want of home produce for food, use bruised cake and oats laid in troughs; cut into slices the turnips and beet as they are consumed, not to expose to drought. Spare no trouble and no reasonable expense at this critical period.

Sell fat cattle, the foremost in condition. The season of curing bacon being over, the farrows must go on for store pigs, and for early fattening in autumn.

Early fat lambs come in for sale about the end of the month, if well managed.

In wet weather, carry to the heaps in the fields all dung from the yards, and litter the yards for soiling.

Prepare most vigorously the turnip fallows by ploughing, harrowing, and rolling. At convenience plough wheat fallows.

METEOROLOGICAL DIARY.

	Barometer.		**Thermometer.**			**Wind and State.**		**Atmosphere.**			**Weat'r.**
1855.	8 a.m in. cts.	10p.m. in. cts.	Min.	Max.	10p.m.	Direction.	Force.	8 a.m.	2 p.m.	10p.m.	
Feb. 21	29.77	29.88	20	31	22	N. East	calm	cloudy	hazy	bright	dry
22	29.88	29.93	15	38	25	Variable	calm	cloudy	sun	fine	dry
23	29.81	30.00	25	37	31	S.W., W. by N.	gentle	haze	cloudy	cloudy	sh. & r.
24	30.00	29.60	29	39	35	S. West	airy	cloudy	sun	cloudy	rain
25	29.38	29.34	33	48	42	S. West	airy	cloudy	cloudy	cloudy	dry
26	29.42	29.77	35	42	36	N. East	gentle	cloudy	foggy	cloudy	rain
27	29.80	29.67	32	38	38	S.W., East	gentle	cloudy	cloudy	cloudy	sm. r.
28	29.67	29.86	35	46	40	Westerly	gentle	cloudy	cloudy	fine	dry
Mar. 1	29.70	29.70	39	52	42	Westerly	lively	cloudy	sun	fine	showery
2	29.40	29.08	39	49	44	S. Westerly	brisk	cloudy	cloudy	fine	showery
3	28.95	29.40	39	48	38	W. by N.	brisk	fine	cloudy	fine	showery
4	29.57	29.60	33	49	38	S. West	brisk	fine	sun	fine	dry
5	29.69	29.80	34	53	34	S. East	gentle	fine	sun	fine	dry
6	29.79	29.85	32	48	34	N.-Easterly	gentle	haze	sun	fine	dry
7	29.84	29.90	28	52	32	E. by N.	gentle	haze	sun	clear	dry
8	30.14	30.11	29	52	28	E. by N.	airy	cloudy	sun	fine	dry
9	30.10	29.94	25	36	32	Various	gentle	cloudy	cloudy	cloudy	snow
10	29.88	29.79	30	35	22	Various	gentle	cloudy	cloudy	clear	snow
11	29.67	29.36	21	35	31	S. East	gentle	cloudy	cloudy	cloudy	snow
12	28.99	28.99	29	38	38	N. West	brisk	cloudy	cloudy	cloudy	rain
13	29.19	29.50	38	45	40	N. West	lively	fine	sun	cloudy	dry
14	29.60	29.67	33	43	37	S. or by East	gentle	cloudy	cloudy	cloudy	dry
15	29.80	29.70	33	46	40	S. or by East	airy	cloudy	cloudy	cloudy	rain
16	29.52	29.72	38	51	40	S. West	airy	fine	sun	fine	dry
17	29.70	29.48	38	50	40	S. West	strong	cloudy	cloudy	cloudy	wet
18	29.68	29.80	35	48	42	West	brisk	fine	fine	fine	showery
19	29.94	29.94	38	48	45	W. by N.	brisk	fine	fine	cloudy	showery
20	29.88	29.64	35	55	40	S. East	various	fine	sun	hazy	drizzly
21	29.41	29.12	36	47	35	E. N. E.	brisk	cloudy	cloudy	cloudy	dry

ESTIMATED AVERAGES OF MARCH.

Barometer.		Thermometer.		
Highest	Lowest.	High.	Low.	Mean.
30.77	28.87	66	24	43.9

REAL AVERAGE TEMPERATURE OF THE PERIOD

Highest.	Lowest.	Mean.
41.9	29.81	35.85

WEATHER AND PHENOMENA.

Feb. 21. Yellow haze till night.—22. In the sun 72 degs.; lunar halo at 10 p.m.—23. Early thaw. 24. Decided south-westerly thaw.—25. Rapid thaw; snow melts.—26. Much yellow fog, and drizzle.—27. Changeable.—28. The same; clouds move rapidly.

LUNATION.—Feb. 23rd, first quarter, 5 h. 34 m. afternoon.

March 1. Airy, fine day; lunar halo.—2. Soaking shower.—3. Fine day.—4. Same.—5. Same.—6. Haze and hoar-frost.—7. Afternoon brilliant.—8. Keen, nearly calm.—9. Chill and gloom.—10, 11. Much snow, thawing.—12. Several showers.—13. Fine cumuli.—14. Overcast.—15, 16. Fine on the whole.—17. Wind and rain.—18. Fine till noon; two hail scuds.—19. A shower.—20. Beautiful.—21. Equinox; driving east wind.

LUNATIONS.—Full Moon, 2nd March, 10 h. 8 m. night. Last quarter, 11th day, 1 h. 59 m. afternoon. New Moon, 18th day, 4 h. 45 m. morning.

REMARKS CONNECTED WITH AGRICULTURE.

Notwithstanding the severity of the protracted winter, the wheat has emerged very satisfactorily. The weather has been subject to great and rapid changes, and remains disturbed. The equinox offers a doubtful prognostic; but wretched as was the day, the barometer continued to rise. We dare not prognosticate, but hope is ever a favourable companion.

Croydon, March 28. J. TOWERS.

REVIEW OF THE CORN TRADE

DURING THE MONTH OF MARCH.

Many occurrences have taken place throughout the month of March to cause sudden and numerous fluctuations in the trade for grain, and not the least was the announcement of the death of the Czar Nicholas, which took place at St. Petersburgh on the second of the month; and so quickly was the news communicated to England, that on the evening of the same day it was announced in both Houses of Parliament, and known throughout the United Kingdom the following day. This unexpected intelligence had an immediate effect on the markets, and for the moment appeared to paralyze business, buyers and sellers being alike indisposed to enter into any transactions until it became apparent what course the new emperor Alexander the Second would take, as it was generally understood, if left to himself, he was peaceably inclined, and that a wonderful change might come over all Europe by this most momentous event; and as the time for the negociations at Vienna was at hand, Lord John Russell being then at Berlin, a favourable turn might be given to them, and peace be the result ultimately, but whether established on a safe and honourable basis for this country most people appeared to express a doubt; and as diplomatists proceeded, no certainty existed, a doubt being entertained from the first that on the part of Russia they were entered into only to gain time, and prolong the final attack on Sebastopol.

In this position of public affairs, the first Monday's market of the month was thrown into a sort of panic; and with a good supply of wheat from Essex and Kent at Mark-lane, the town millers acted with the greatest caution, and took off very limited quantities at a reduction of 4s. per qr. on the rates of the previous week, confining their purchases to the finest qualities, and leaving a considerable portion of that day's supply over unsold for future markets. The state of the weather had been such, that a rapid thaw had opened the river, and enabled all the vessels to deliver their bulks into lighters, and in this respect business was steadily being resumed. So great a number of ships arrived in this port as to give immediate relief to all previously unemployed labourers, and work became at once abundant; but coming from the westward, there was a very limited portion with grain. The imports of foreign wheat were quite trifling, consisting of 910 qrs. from Bilboa, 720 qrs. from Requejada, 670 qrs. from Santander, and 510 qrs. from the East Indies, making a total of only 2,810 qrs., against 17,256 qrs. the corresponding week of last year. The decline submitted to on most descriptions was about 3s. per qr.; but there were no pressing sellers, and the business transacted was only to a very limited extent: the stocks of fine qualities were very low, and on this account the importers were not disposed to follow the market down so fast as the buyers wished, and thus checked business. The London average registered 73s. 3d. on 1,441 qrs. The returns of the 290 towns amounted to 89,402 qrs. at 68s. 6d., against 61,890 qrs. at 78s. 3d. the corresponding week of the past year.

Such advices from town had naturally considerable influence on the markets of the agricultural districts, although the farmers know too well their position to be so much panic-stricken as the factors at Mark-lane, and many of them refused to bring out their samples, knowing that the millers, for want of foreign supplies, must soon come to them, or put down their mills, and in general the business transacted throughout the week was to a limited extent—in some instances at 2s. to 3s. per qr. decline. Fine weather prevailing, field work was going on steadily; and as thrashing will almost cease until seed-time is over, the deliveries will fall off considerably, and even that thrashed so extensively during the severe weather, will not be brought forward freely, and once the demand fully overtakes the supply, it is well known what that effect will be on prices, particularly as no imports worth naming are likely to take place for some time to come from any quarter of the globe. The farmers are in a position to act a little more independently than usual, and they are entitled to at least one good year in seven. Already their deliveries of the last crop have been very large, and they will have to supply the markets for some time to come, giving them an opportunity of realizing remunerating prices; and it is well for the country at large that such a superabundant harvest was reaped as that of 1854, which has proved a great blessing to this land, and kept an immense amount of money to ourselves, the manufacturing interests having had good customers at home, without having to pay so exorbitant a price for their loaf.

The quantity of wheat brought forward at Mark-lane the second Monday was short from Essex and Kent, with a very limited supply from more distant counties. This brought about an immediate change, and a brisk demand was experienced at an advance of 3s. per qr., all the fresh supply having been cleared off at an early hour of the day, and much more appeared to be wanted by the town millers. There was an improved sale for foreign wheat, and the value of all good samples was enhanced 2s. per qr. The imports were trifling, consisting of 680 qrs. from Harlingen, 875 qrs. from Lisbon, and 20 qrs. from St. Michaels, making a total of 1,575 qrs., against 24,516 qrs. the corresponding week of last year. The London average registered 72s. 9d. on 2,868 qrs. The returns were 92,979 qrs. at 68s. per qr., against 65,753 qrs. at 79s. 6d. the corresponding week of last year. Predisposed as the farmers were to ask more money with this sudden removal of the panic and brisk advices from the metropolis, an active demand took place in wheat in all the agricultural districts, and the enhancement in the value of good qualities was 2s., 3s., and even 4s. to 5s. per qr. in some markets, according to the supply brought forward, the millers buying pretty freely, and a few of the previously thrashed samples were disposed of, but there appeared no hurry to sell whilst the farmers' men could be better employed in the fields, and the deliveries were not large. The days had been fine and favourable for field work, but the nights cold and frosty, that of the eighth registering eight degrees of frost; and winter had not quite left us, for on the tenth and eleventh some heavy snow-storms occurred, and the ground was once more covered; but a complete change took place on the afternoon of this Monday, and a good deal of rain fell, and melting away all the snow, that on the following morning there was not the least appearance of any throughout the country.

With this improved tone in the trade, although a moderate quantity of wheat was brought forward at Mark-lane the third Monday, it met a steady sale at 2s. per qr. over the currency of the previous Monday; but this improvement had taken place on the Friday, some choice white Chidham weighing about 64lbs. per bushel commanded 81s. per qr., and all other good sorts in the same proportion, the market thus fully recovering what it had lost by the death of the Czar, with a limited quantity left on hand, and no prospect of any material supplies coming forward from distant counties, as better prices are made to millers on the spot, who now require all the farmers can bring forward to supply the home demand for flour. As foreign wheat had not been so depressed, the enhancement was not more than 1s. per qr. generally; but really choice Danzig has become so scarce, that those millers who must have this description for their fancy brands must pay dear for it; one parcel of very heavy extra quality actually commanded 100s. per qr., being the highest price registered in some length of time, it was reported to weigh 66lbs. per bushel, an unusual weight for Danzig. The imports consisted of 120 qrs. by a Russian prize from the Baltic, 1,020 qrs. from the East Indies, 224 qrs. from Harlingen, and 75 qrs. from St. Michaels, making a total of 1,439 qrs., against 38,688 qrs. the corresponding week of last year. The London average registered 70s. 4d. on 4,911 qrs. The returns were 80,337 qrs. at 66s. 11d., against 53,244 qrs. at 79s. 2d. the corresponding week of last year.

In the agricultural markets held during the week, the deliveries from the farmers were moderate, and the millers took off a fair quantity, paying generally more money where the supply was somewhat short; but towards the close the demand was not so good as in the earlier part of the week, probably owing to the news being up to that point tolerably favourable from Vienna; but as yet the struggle there has to take place, when the discussion about Sebastopol will be touched upon.

The supply of English wheat at Mark-lane the fourth Monday of the month was very good from Essex, but short from Kent, and the town millers acted with great caution, and the trade again ruled dull; a few parcels of choice quality were taken at nearly former rates, but the general sales were at 1s. to 2s. per qr. reduction in price. Beyond a supply from these two counties, there was not much offering, the merchants selling for delivery by railway not being able to purchase low enough to send up to the metropolis and pay the expenses of transit, the demand at the country markets nearly taking off all the supplies brought forward, whilst the farmers are so fully occupied with spring tillage. Many of our largest mills are not fully at work; and if we do not get increased supplies soon, they will have some difficulty in continuing at full work throughout the day; already night work has been in many instances stopped, and from the unfortunate position of the flour trade, they appear generally careless as to employing all their power or not. The London average registered 70s. 1d. on 3,480 qrs. The general returns were 82,905 qrs. at 66s. 6d., against 46,739 qrs. at 78s. 4d, the corresponding week of last year.

The fluctuations in wheat have of course caused some in the article of flour, and the public has rather gained than lost by the changes. The first Monday of the month, the millers put down the top price of town made 5s. per sack, reducing it from 70s. to 65s. per sack, and all other descriptions felt the influence of this decline: the best country marks receded 2s. per sack; but the deliveries were good, for whilst 11,661 sacks had arrived by the Eastern

Counties Railway, 14,369 sacks were delivered within the week: the other arrivals were 610 sacks coastwise, and 2,245 sacks by the Great Northern Railway, with 10,105 sacks from foreign ports, principally Spanish, and 13,997 brls. from the United States.

The second Monday, rather higher prices were generally obtained, when the arrivals consisted of 2,600 sacks coastwise, 12,135 sacks by the Eastern Counties Railway, 3,049 sacks by the Great Northern, 3,972 sacks from foreign ports, and 3,275 brls. from the United States.

At the third Monday's market an advance of 1s. to 2s. per sack was established on choice country marks. The arrivals consisted of 1,030 sacks coastwise, 12,096 sacks by the Eastern Counties Railway, and 3,164 sacks by the Great Northern, with 2,448 sacks foreign, and 3,495 brls. from America.

Trade at Mark Lane on the fourth Monday was not so brisk as previously for any description. The arrivals coastwise were 2,402 sacks, by the Great Northern Railway 2,819 sacks, by the Eastern Counties 10,614 sacks, and from foreign ports 400 brls.

The greatest fluctuations have taken place in Norfolk, so many "ups and downs" even in one market-day that they are now as well known in Mark Lane by the appellation of "Norwich Consols" as their real name: prices paid within the month have ranged from 47s. to 52s. per sack, and as an auction is established at Norwich for this article, their character would be kept up by having one in London weekly.

The article of barley has not participated in the moves which have been experienced in other descriptions of grain: being the lowest of any, there was no room for its going down lower, and no anxiety to get into stock on the part of buyers, when other articles were brisk and creeping up. The deliveries from the farmers have steadily fallen off, and are likely to do so the remainder of the season; for when seed time is past, the farmers will probably not increase the supply for want of a stock. We have had scarcely any imports of foreign all the month, and it will be late before any can come forward from Denmark this spring, and the demand in the Baltic having been so good from the interior of Germany, not much at any time can be expected from thence; and from the South of Europe there is no prospect of any worthy of notice coming forward: prices everywhere seem too high for our importers, and purchases at home are much better made than abroad, if the heavy qualities of Denmark are excepted. Fine malting qualities have become very scarce, but the maltsters have bought without spirit throughout the month, from the continued inactivity in the demand of the manufactured article: at one time they seemed more inclined to purchase; as, if peace were established, they would enjoy the reduction in the duty on their stock. But as the large brewers came so carelessly forward, this feeling died away, in spite of the small make of malt. 42,039,748 bushels were made in the year ending 5th January, 1854; but only 36,819,554 bushels the year ending 5th January last. Were the general trade of the country to become lively, this great difference in the make would be materially felt. The quantity returned the 3rd inst. was 75,101 qrs., at 30s. 11d.; on the 10th, 67,721 qrs., at 30s. 6d.; on the 17th, 67,337 qrs., at 30s. 5d.; on the 24th, 60,943 qrs., at 29s. 9d.

The long continuance of easterly winds during the prevalence of the severe weather allowed the vessels coming from Ireland to accumulate to a considerable extent; and in our last review, we stated that as the wind had shifted, with a complete change in the weather, these vessels might be expected to arrive as soon as the river was completely clear of the ice to enable them to drop up, and by the first Monday of the month they had begun to come in. For that market-day, 25,683 qrs. arrived from Ireland, whilst there were only 213 qrs. from our own coast, 2,949 qrs. from Scotland, 2,873 qrs. by the Eastern Counties Railway, and 3,344 qrs. by the Great Northern, making a total of 34,982 qrs. This supply had some effect, and the dealers were enabled to buy Irish at a reduction of 1s. to 2s. per qr.; but English and Scotch were only 1s. per qr. lower. Many of the cargoes from Ireland having been so long at sea, came to hand out of condition, and the decline was most on these.

For the next Monday's market, the great bulk of the Irish shipments had got in, amounting to 42,610 qrs.; but from other sources the supplies were unimportant, consisting of 1,304 qrs. from our own coast, 760 qrs. from Scotland, 80 qrs. from Harligen, 2,230 qrs. by the Eastern Counties Railway, and 3,329 qrs. by the Great Northern, making a total of 50,313 qrs. It is frequently the case that anticipation effects a decline, and when the great supply gets on to the market, improvement immediately takes place: such was experienced to be the case now; an advance of fully 1s. per qr. was established on all Irish samples, with a large business transacted both to the dealers and consumers.

At Mark Lane the third Monday of the month, supplies of all sorts were on a very moderate scale, consisting of 1,130 qrs. from our own coast, 2,359 qrs. from Scotland, 6,976 qrs. from Ireland, 40 qrs. from Harlingen, 1,465 qrs. by the Eastern Counties Railway, and 1,067 qrs. by the Great Northern, making a total of 13,037 qrs. Trade was firm and a shade higher, and the decline caused by the previous large Irish supply was fully recovered; the stocks in granary of all sorts having been much reduced, the consumption was immediately begun on the Irish, and the greatest portion has gone off the market and into use at once, but it will be some-time before we have such another large supply from any quarter. The Irish are generally supposed to have lost money from the high rates paid in Ireland; but having gone into four hands only, the losses are not spread over the market, and will be little felt.

The fresh arrivals at Mark Lane the fourth Monday of the month consisted of 1,533 qrs. coastwise, 1,671 qrs. from Scotland, 5,640 qrs. from Ireland, 476 qrs. from foreign ports, 2,672 qrs. by the Eastern Counties Railway, and 1,935 qrs. by the Great Northern, making a total of 13,927 qrs. The dealers bought to a fair extent, and the consumers took a good quantity, prices being well supported. The importations of this article for the corresponding week of last year was 90,618 qrs., showing a wonderful difference at the two periods; but still it had no effect on the market, and no description of buyers appear disposed to hold any material stock, each week the quantity required coming forward regularly either by rail or shipping.

The deliveries of beans have been very large during this month; the farmers having thrashed this article very freely during the wintry weather, were ready and disposed to deliver as many as they could. Although the prices had continued to decline, it was generally supposed that as soon as planting commenced prices would rally; but this has not been the case, and a few cargoes of Egyptians dropping in, both here and at Liverpool and Glasgow, up to the middle of the month, lower rates were accepted for all descriptions; but from that point there has been rather more enquiry for fine qualities, and the downward tendency may be considered to have stopped; but no one appears disposed to purchase beyond what is required for immediate use, and no description of buyers show any desire to lay by a stock for keeping another year, although fine old qualities are scarce, and few likely to be left over. There are some now on sale of fine quality, which would keep well; but the price is considered too high by many parties who usually like to hold this article by way of an investment: the railways, however, check a feeling to hold any stocks of grain, as, if any article is wanted, it can be secured in 24 hours from a goodly distance, and this operates against the trade in a measure, and prevents any one keeping up his usual supply. The weekly average to the 3rd instant was 42s. 2d. on 7,425 qrs.; that to the 10th, 40s. 8d. on 7,355 qrs.; to the 17th, 40s. 4d. on 5,266 qrs.; to the 24th, 40s. on 5,201 qrs. The corresponding weeks of last year were 45s. 10d. on 5,309 qrs.; 45s. 2d. on 6,213 qrs.; 45s. 11d. on 4,942 qrs.; 45s. on 4,311 qrs.

The article of peas has continued to puzzle the trade more than any other; for with limited deliveries from the farmers, most descriptions have remained very dull, and have steadily declined in price. As to foreign, no imports could take place, and the stocks of this description are much reduced; indeed, there are scarcely any fine samples to be met with at present, no encouragement having been given to send any quantity to market, and the farmers have consumed the article very largely for their own cattle. There is no prospect of any imports from the continent for a long time to come, and the only demand likely to take place worthy of notice is now and then a Government contract for fine white boilers, which are generally competed for by the usual contractors, whose opposition, when they make offers, often results in a loss to those who are the *successful* candidates for supplying our navy with a prime commodity; and it is certain that on this point much care is almost always taken, for a bad article will not "pass muster." At present a few are still wanted for this purpose, for the last contract; and quality is difficult to be found. The weekly average, on the 3rd inst., was 39s. 9d. on 1,847 qrs.; on the 10th, 39s. 4d. on 1,280 qrs.; on the 17th, 38s. 6d. on 1,802 qrs.; on the 24th 38s. 9d. on 1,339 qrs. The corresponding weeks of last year were 48s. 5d. on 1,650 qrs.; 45s. 2d. on 1,528 qrs.; 47s: 5d. on 1,123 qrs.; 47s. 7d. on 961 qrs.

There has been an important trade in English cloverseed this month, which has been the greater from the imports of French being so very limited. Samples of red have been taken extensively for Scotland and Ireland, and prices are 2s. to 3s. per cwt. higher, on the average, for this description; whilst white has become so scarce that a sufficiency of English cannot be obtained, and unless the Elbe opens speedily the imports may be too late. Up to the 16th inst., the nights there remained frosty, and then the navigation was still closed; since it has been opened, on the 19th, one steamer got away from Gluckstadt, and on the 20th another left Hambro', and these have arrived in the Thames. The prices of this description run up 8s. per cwt. for want of a supply: every parcel of good seemed to be cleared off this market on the 19th inst. The navigation of Holland was opened earlier; the various rivers from the interior having risen rapidly from the melting of the snow in the mountainous districts, up the Rhine, and elsewhere, the ice was *lifted* up and dispersed very suddenly, all the low lands having been inundated, and much damage done at various towns. But little supply of white has yet come from thence.

Trefoil, too, has been sold closely up to the supply, and fine samples have run up to 32s. per cwt. A few small parcels are dropping in from France this season, of very inferior quality, and it would not command much attention were not English so scarce; but this description has also improved in price, inferior as the quality has been.

The imports of tares having been so short, the demand for this article is steadily overtaking the supply, and prices are creeping up as the season advances. Small samples are now worth 54s. to 56s. per qr.; large Brunswick, 68s. to 72s.; very large Scotch, 72s. to 80s. per qr., with a much reduced stock of all foreign qualities; and some of our buyers appear to be tired of waiting any longer for the Hambro' supplies, and are taking the best they can find; and those from France are going into consumption steadily as fast as they come in. As yet, they arrive in very small quantities: and from the high prices paid in France, they do not leave much profit, even at the current prices; and, from present appearances, all will be wanted this season. The quality of those which had previously arrived from the north of Europe is very good, particularly the large Brunswick; and a considerable quantity of these would sell, if here in time. The above prices brought forward an increased quantity from Scotland towards the close of the month, and useful qualities were then bought on lower terms—at from 64s. to 70s., French 52s. to 54s., and Brunswick 68s. per qr.—the high freight by the first steamers from the Elbe checking any material decline, that being from 7s. to 8s. per qr., owing to the anxiety of shippers to get these off in time for the seed demand in England.

The imports of foreign corn produce, published in the *Gazette* of the 24th inst. by the Board of Trade, show a total of 179,960 qrs. of grain and 106,765 cwt. of flour, &c., in the month ended the 5th inst., against 488,163 qrs. grain and 393,390 cwt. flour in the corresponding month of last year. The different articles stand thus—

	1854.	1855.
	qrs.	qrs.
Wheat........	283,362	73,221
Barley........	32,366	5,002
Oats..........	24,828	3,379
Rye..........	30	956
Peas..........	3,160	2,662
Beans........	27,914	17,419
Maize........	116,455	77,420
Buckwheat....	48	1
Total........	488,163	179,960
	cwt.	cwt.
Flour, &c.....	393,390	106,760

In our last review, we made the total decrease of the previous four months equal to 1,261,835 qrs. of the three leading articles of wheat, maize, and flour; and adding the above decrease, the flour brought into quarters, the deficiency of five months will be 1,553,581 qrs. And all this deficiency has been made up by our abundant crop of wheat of 1854, the deliveries of which have been excessive, and are yet tolerably well kept up by the farmers.

The imports of the three leading articles of the trade for the past five years will afford a degree of interest to our readers, and show the immense quantity of grain consumed in the United Kingdom during that period; but it will cause some surprise that we are at the present time receiving such limited supplies of foreign grain, and the trade be occasionally so languid, and every description of buyer frightened to hold any stocks or prepare any shipments for future markets, waiting until actual wants give a different tone to trade, and enliven business in every branch thereof. The imports consisted of the following immense quantities, for the twelve months ended

	Wheat.	Maise.	Flour.
	Qrs.	Qrs.	Cwt.
October 10th, 1850....	3,513,590	1,463,649	2,855,698
„ „ 1851....	4,333,127	1,564,150	6,048,355
„ „ 1852....	2,455,542	1,392,741	4,118,794
„ „ 1853....	4,847,364	1,881,710	4,494,104
„ „ 1854....	4,342,022	1,682,633	4,696,387
Amounting to....	19,491,645	7,984,883	22,208,838
Reducing the flour to wheat, at 392lb. flour to 1 qr. wheat......	6,345,239		
Total imports....	25,836,884 qrs.,		

Or 5,167,377 qrs. annually of wheat and flour, other articles being in the same proportion. The state of the weather in the north of Europe has been such that shipments could not be made; and the imports of the past week were only 2,885 qrs. wheat, whilst those of the corresponding week of last year amounted to 109,368 qrs.; and of oats they were only 476 qrs., against 90,618 qrs. the corresponding week of last year; and, from present appearances, they may be no larger next month.

From the United States our advices are up to the 7th of the month, when a somewhat more active business had been transacted in all descriptions of breadstuffs, at prices the turn higher. The receipts of flour by the railways had considerably fallen off; and a steady eastern demand had given a better tone to the trade for all State brands, and for the best descriptions of Canadian, at an advance of 12½ to 25 cents per barrel. The supplies of wheat were hardly sufficient for their local requirements, and higher rates were demanded. Indian corn had been taken to some extent for shipment to Europe and to the eastern states, enabling holders to realize an advance of 2 to 3 cents per bushel on the previous quotations. With the nearer approach of spring, nothing had occurred to indicate the probable range of prices of the navigation. There were no stocks on hand along the entire seaboard of the United States; and, as far as could be ascertained, there were no overwhelming supplies to come forward from the western states. The war in Europe continued to attract the attention of the Americans; and they say it seems now likely to be prolonged indefinitely, and during its continuance all the available supplies will be inevitably wanted at high prices.

Flour was firmly held at 8 dols. 50 c. to 8 dols. 75 c. per brl. for No. 1 State superior, equal to about 40s. per brl.; Ohio, 9 dols. to 9 dols. 25 c.; Canadian, 9 dols. 50 c. to 10 dols. 25 c. Wheat was sold at 2 dols. 65 c. to 2 dols. 70 c. for white Genessee, equal to about 90s. per qr. without shipping expenses; fine red, 2 dols. 20 c. to 2 dols. 30 c., equal to about 74s. per qr.; Canadian, 2 dols. 30 c. to 2 dols. 50 c. per 60lbs. Indian corn was in good demand at 97 c. per bush. of 56lbs. for white and yellow, and 95 c. to 96 c. for low mixed.

The following were the imports from the 1st of September:—

	FLOUR.	WHEAT.	MAIZE.
	Barrels.	Bushels.	Bushels.
From New York to March 6..	277,645	156,218	3,308,214
New Orleans to Feb. 24	51,405	2,377	203,325
Baltimore to March 3..	158,075	22,334	246,695
Philadelphia to March 3.	76,857	15,048	475,377
Other ports to March 1..	44,748	5,700	25,754
Totals........	608,730	201,677	4,259,365
Same period last year........	2,675,051	6,687,247	2,883,631

From the above quotations and observations, it appears very improbable that any supplies can come forward to this country without a considerable decline across the Atlantic, or a very material improvement on the value of wheat and flour in this country. Indian corn may be shipped to leave a trifling profit at our present quotations and the value of this article free on board in the States; but Ireland alone wants it, for neither England nor Scotland will use it for bread, and it is doubtful whether our own population will ever resort to it, or the Scotch leave off their use of oatmeal, and eat it in any shape of cake.

The continental markets have been kept in a quiescent state by the severity of the weather, and prices of grain have been without any material variation since the winter set in, with little passing at most ports of the north of Europe. The flat advices from England produced inactivity at Danzig, growers bringing limited supplies forward. Old 61lbs. wheat fetched there 68s. to 69s. per qr., and 63 to 64lbs. commanded 74s. to 75s. per qr., this description being brought forward in small supplies. From the thickness of the ice at that port, the navigation will not be open until probably the middle of April. Prices of red wheat at Rostock were quoted at 63s. to 64lbs. per qr. free on board at open water. The thermometer there was 8 degrees below freezing on the 15th of the month, and it will there also be the middle of the month before spring shipments can commence. At Stettin, 60lbs. wheat, Uckermark and Pomeranian, must be quoted at 61s. per qr. free on board at open water; freight 3s. 6d. to a coal port, and 5s. to 5s. 6d. to the west coast. At Hamburg, the finest red Wahren wheat (60 to 61lbs.), for delivery first open water, was offering at 66s. to 66s. 6d., and same weight red marks 63s. to 64s. per qr. of 480lbs. A cargo of 59lbs. red wheat was sold at Neustadt at 59s. per qr., with a freight of 5s. 6d. per qr. to the east coast of England. Danish wheat was offered freely at 59s. to 60s. per qr., and 60 to 61lbs. Pomeranian at 60s. to 61s. per qr. Barley on the spot is selling in retail at 34s. 6d. to 35s. per qr., 56lbs. per bushel. In Danish barley at the outports a good business had been done, 5,000 qrs. having changed hands at 28s. for 53½ to 54lbs. kiln-dried, same quality undried at 26s. 6d. to 27s.; and 53½lbs. Jutland at 25s. 6d. to 26s. per qr.

The French markets have been in a lifeless state throughout the month, fluctuating to a very trifling extent both in wheat and flour. At Paris on the 26th of the month there was a difficulty in selling flour at 83 to 84 francs the culasse of 159 kilos, equal to about 67s. to 70s. per 350 lbs., or 53s. to 56s. per 280 lbs.; and the reserved stock was 15,025 quintals., or 30,050 cwt.: certainly a small quantity near such a city. There seems, however, a carelessness about the price of flour in that capital, as the price of bread remains settled, as it has done for a long time past, at 40 cents. for the first quality, and 32 cents. for the second sort—being one-eighth less than the average prices struck according to their law, and which loss the Government continues to pay; thus keeping the Parisians in good humour, but the settling day may sooner or later change this system. In the various departments red wheat has generally brought 67s. to 68s. per qr.: about its value on the London Corn-exchange.

There have been tolerably good deliveries of wheat in the Belgian markets, and prices have rather given way; but prime red samples are worth 68s. to 70s. per qr.

The Dutch markets have remained inactive, with a tentency to lower prices. That country has been much inundated since the breaking up of the frost. The snow in the distant Rhenish provinces and high up in the mountains of Switzerland having melted rapidly, swelled the rivers to a considerable height, and lifted the ice suddenly up, clearing it away quicker and more effectually than in any other country.

In our last review we expressed an opinion that the good coating of snow through the very severe weather would have protected the wheat plant; but we have unfortunately since learnt that the high and cold easterly winds had so blown it off the land in exposed situations as to cause some apprehension that it had received injury, and that the frosty nights since the beginning of the month, when it had no covering, have rather increased the injury sustained; and in many countries the light soils have continually suffered; and unless we get warm and more genial weather soon, there is now some apprehension of mischief to the crop. Our agricultural reports must be read with great interest at this moment—so much depending on the next crop; and it will be fortunate for the country if favourable and genial weather were immediately to set in, and remove at once the gloomy doubts that arise. The spring will be a backward one; and the consumption of hay and corn must be very large before any grass can be ready, after such cold and piercing north-east winds as have prevailed during the month of March. April showers, however, often work wonders; and let us hope that this will be the case before our next review has to make its appearance.

CURRENCY PER IMPERIAL MEASURE.

Shillings per Quarter.

WHEAT, Essex and Kent, white	71	to 73	extra	74	79
Ditto, red	64	67	„	67	69
Norfolk, Lincoln. and Yorksh., red	64	66	„	67	68
BARLEY, malting, new	29	30	Chevalier	31	33
Distilling	29	30	Grinding	27	29
MALT, Essex, Norfolk, and Suffolk, new	65	66	extra		70
Ditto ditto old	66	68	„		70
Kingston, Ware, and town made, new	70	71	„		72
Ditto ditto old	68	70	„		71
RYE	—	—		39	40
OATS, English feed	24	25	Potato	27	28
Scotch feed, new 27 28, old	31	32	Potato	31	33
Irish feed, white	24	25	fine		27
Ditto, black	23	24	fine		25
BEANS, Mazagan	35	36	„	37	38
Ticks	36	39	„	38	40
Harrow	36	38	„	39	40
Pigeon	38	44	„	38	44
PEAS, white boilers 37 44.. Maple	37	39	Grey	34	37
FLOUR, town made, per sack of 280 lbs.	—	—	„	60	65
Households, Town 60s. 61s. Country		—	„	51	53
Norfolk and Suffolk, ex-ship	—	49	extra		50

FOREIGN GRAIN.

Shillings per Quarter.

WHEAT, Dantsic, mixed	78	to 80	high mixed	— 82	extra 87
Konigsberg	74	76	„	— 80	„ 82
Rostock, new	74	76	fine	80	„ 84
American, white	76	80	red	70	72
Pomera., Meckbg., and Uckermk., red	73	74	extra	75	76
Silesian „	71	72	white	73	76
Danish and Holstein „	64	68	„	69	73
Rhine and Belgium „	—	—	old	—	—
Odessa, St. Petersburg and Riga	64	66	fine	68	70
BARLEY, grinding	26	29	Distilling	29	30

Oats, Dutch, brew, and Polands 27s. to 28s. Feed .. 25 26
Danish & Swedish feed 26s. to 27s. Stralsund 27 28
Russian...... 26 28 .... French.. none
Beans, Friesland and Holstein.................. 38 40
Konigsberg .. 36 40 .... Egyptian .. 35 36
Peas, feeding .... 36 37 fine boilers 41 43
Indian Corn, white......... 44 45 yellow 44 45
Flour, French, per sack...... 57 60 Spanish 57 60
American, sour, per barrel 36 38 sweet 38 42

IMPERIAL AVERAGES.

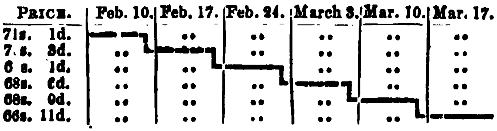
For the last Six Weeks.

	Wheat.		Barley.		Oats.		Rye.		Beans		Peas.	
Week Ending:	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.
Feb. 10, 1855..	71	1	32	6	26	2	42	1	43	9	40	5
Feb. 17, 1855..	70	8	31	9	25	7	45	3	43	1	41	0
Feb. 24, 1855..	69	1	31	5	25	6	41	1	43	3	39	8
March 3, 1855..	68	6	30	11	25	3	41	10	42	0	39	9
March 10, 1855..	68	0	30	6	25	2	38	7	40	8	39	4
March 17, 1855..	66	11	30	5	24	10	39	4	40	4	38	6
Aggregate average of last six weeks	69	0	31	3	25	5	41	4	42	2	39	9
Comparative avge. same time last year	79	8	39	1	27	8	49	1	46	8	49	1
Duties........	1	0	1	0	1	0	1	0	1	0	1	0

COMPARATIVE PRICES AND QUANTITIES OF CORN.

Averages from last Friday's *Gazette*.	Qrs.		Av. s.	d.	Averages from the corresponding *Gazette* in 1854.	Qrs.		Av. s.	d.
Wheat....	80,337	..	66	11	Wheat....	53,244	..	79	2
Barley....	67,337	..	30	5	Barley....	55,682	..	38	9
Oats	28,285	..	24	10	Oats	16,955	..	27	7
Rye......	67	..	39	4	Rye......	134	..	50	2
Beans....	5,266	..	40	4	Beans....	4,942	..	45	11
Peas	1,802	..	38	6	Peas	1,123	..	47	5

DIAGRAM SHOWING THE FLUCTUATIONS IN THE AVERAGE PRICE OF WHEAT DURING THE SIX WEEKS ENDING MARCH 17, 1855.



PRICES OF SEEDS.

BRITISH SEEDS.

Cloverseed, red, (per cwt.)	52s. to 65s.
Ditto white........................	70s. to 80s.
Cow Grass (per cwt.)	62s. to 70s.
Trifolium Incarnatum (none)	00s. to 00s.
Rye Grass (per qr.)	22s. to 32s.
Furze (none offering).....................	00s. to 00s.
Tares, small 00s. to 00s., large 60s. to 68s.,	winter 00s.
Trefoil, (per cwt.)...............	25s. to 30s., extra 32s.
Sainfoin, scarcely quotable	60s.
Coriander (per cwt.)	20s. to 24s.
Carraway (per cwt.).... new 44s. to 46s., old	00s. to 00s.
Canary (per qr.)........................	48s. to 52s.
Hempseed (none)	00s. to 00s.
Linseed (p. qr.) sowing 68s. to 70s., crushing	65s. to 67s.
Linseed Cakes (per ton)	£12 0s. to £12 5s.
Rapeseed (per qr.)	new 78s. to 80s.
Ditto Cake (per ton)	£6 10s. to £6 15s.

FOREIGN SEEDS, &c.

Clover, red, French	48s. to 56s.
Ditto, white, German	60s. to 75s.
Tares (per qr.)	new, small 52s., large 68s.
Ryegrass, Italian (per qr.)........	20s. to 22s., extra 30s.
Hempseed, small, (per qr.) 48s. 50s.,	Ditto Dutch, 56s.
Coriander (per cwt.)	15s. to 20s.
Carraway	36s. to 38s.
Linseed (per qr.) Baltic, 58s. to 62s.;	Odessa, 66s. to 67s.
Linseed Cake (per ton)	£11 10s. to £12 5s.
Rapeseed	78s. to 80s.
Rape Cake (per ton)................	£6 10s. to £6 15s.

HOP MARKET.

BOROUGH, Monday, March 26.—The trade has continued steady throughout the past week, and prices on the whole are tolerably maintained at the rates of this day week.

POTATO MARKETS.

SOUTHWARK WATERSIDE.

Monday, March 26.

During the past week the arrivals coastwise and by rail have been very large, and a great quantity left over from former arrivals has caused a dulness in the trade, and second-rate samples are almost unsaleable at any price.

The following are this day's quotations :—

	s.	d.		s.	d.
Yorkshire Regents	100	0	to	120	0
East Lothian do.	100	0	—	110	0
Perth, Fife, Forfarshire ditto..	75	0	—	90	0
Reds and Cups	70	0	—	90	0

PRICES OF BUTTER, CHEESE, HAMS, &c.

Butter, per cwt.	s.	s.	*Cheese, per cwt.*	s.	s.
Friesland	106 to	108	*Cheshire*	66 to	80
Kiel............	108	112	*Chedder*	68	80
Dorset, old	90	96	*Double Gloucester*	60	70
Carlow	100	106	*Single do.* ..	58	66
Waterford	94	100	*Hams, York* ....*new*	76	82
Cork, new	92	100	*Westmoreland.* „	78	81
Limerick	84	94	*Irish* .... „	66	76
Sligo	96	102	*Bacon, Wilts., dried..*	68	70
Fresh, per doz.	12s. 0d.	15s. 0d.	*Irish, green....*	62	64

WOOL MARKETS.

BRITISH WOOL TRADE.

CITY, Monday, March 26.—There is rather more Wool on offer in our market. For all kinds the demand is very heavy, and prices are nominally the same as on Monday last.

	s.	d.		s.	d.
Down tegs	1	0	—	1	1
Half-breds	1	0	—	1	0½
Ewes, clothing	0	11	—	1	0
Kent Fleeces	1	0	—	1	1
Combing Skins	0	11	—	1	0½
Flannel Wool..........	1	0	—	1	1½
Blanket Wool..........	0	7	—	1	0
Leicester Fleeces	0	11	—	1	0½

BRADFORD WOOL MARKET, Thursday.—The choice of all sorts is very limited, but the demand is so scanty that the trade is still inanimate and cheerless.

LEEDS WOOL MARKET, March 23.—There has been rather more doing in combing wool this week, to supply the immediate wants of the manufacturers, and last week's prices are firmly maintained. In clothing wools we do not quote any alteration.

YORK WOOL MARKET, Thursday.—We had a good show of wool to-day, and several respectable buyers. All the wool shown was sold at former prices.

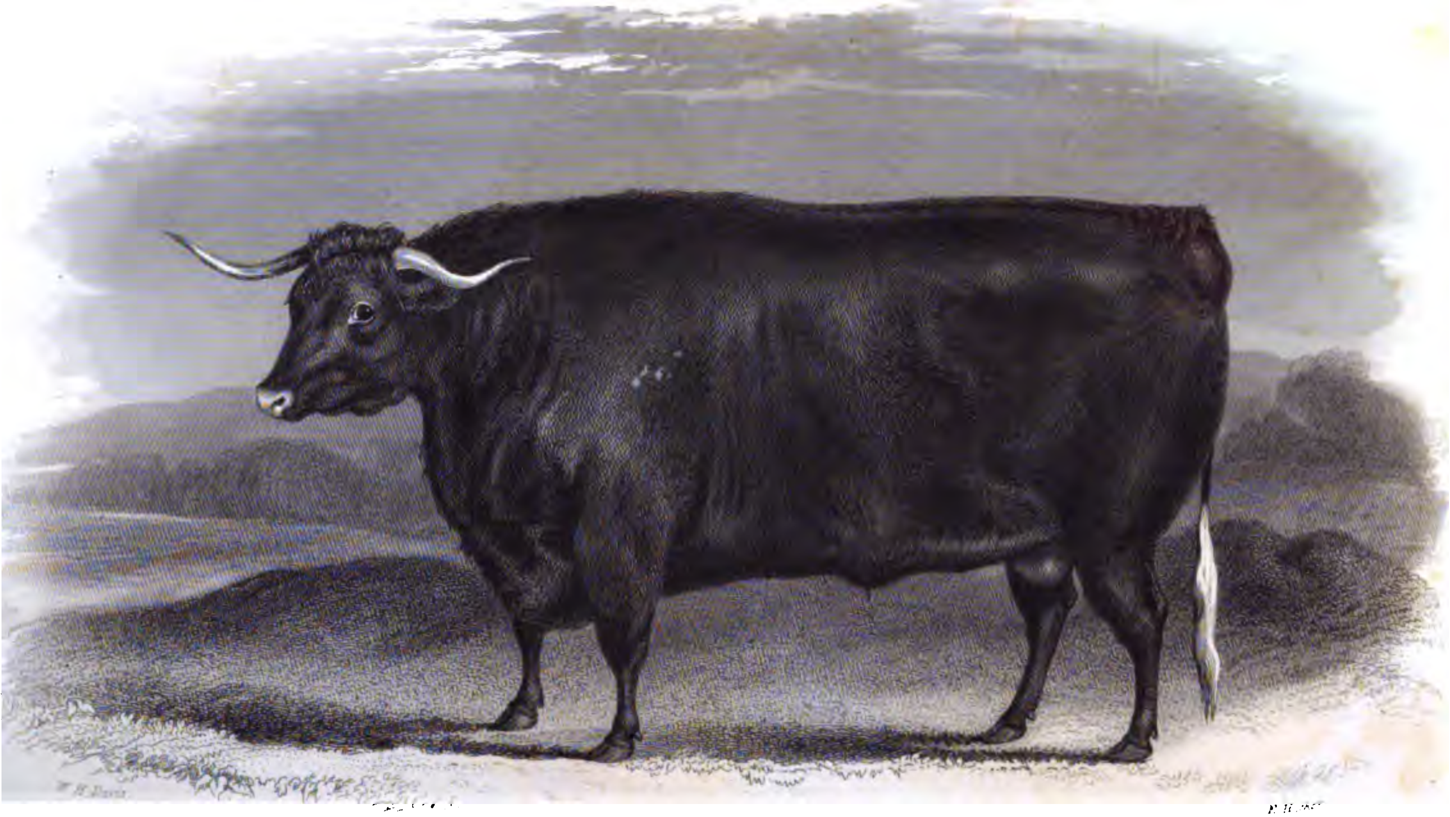
LIVERPOOL WOOL MARKET, March 24.

Scotch Wool.—There is only a moderate demand for laid Highland, and that only of the best class. White Highland is in fair demand, and stock light. The market is pretty well cleared of the best class of Cheviots and Crossed, and the stock now consists of heavy and bad-conditioned, for which there seems no demand.

	s.	d.		s.	d.
Laid Highland Wool, per 24lbs. ..	9	0	to	9	6
White Highland do.	12	0		14	0
Laid Crossed do..unwashed	10	6		11	6
Do. do..washed	12	6		13	6
Laid Cheviot do..unwashed	13	0		15	0
Do. do..washed	14	6		17	0
White Cheviot do. do	21	0		24	0

Foreign Wool.—There is a fair demand by private contract for all kinds of useful medium class wools; but for export and the home trade the stocks of such are now much reduced.

Printed by Rogerson and Tuxford, 246, Strand, London.



A Devon Steer.

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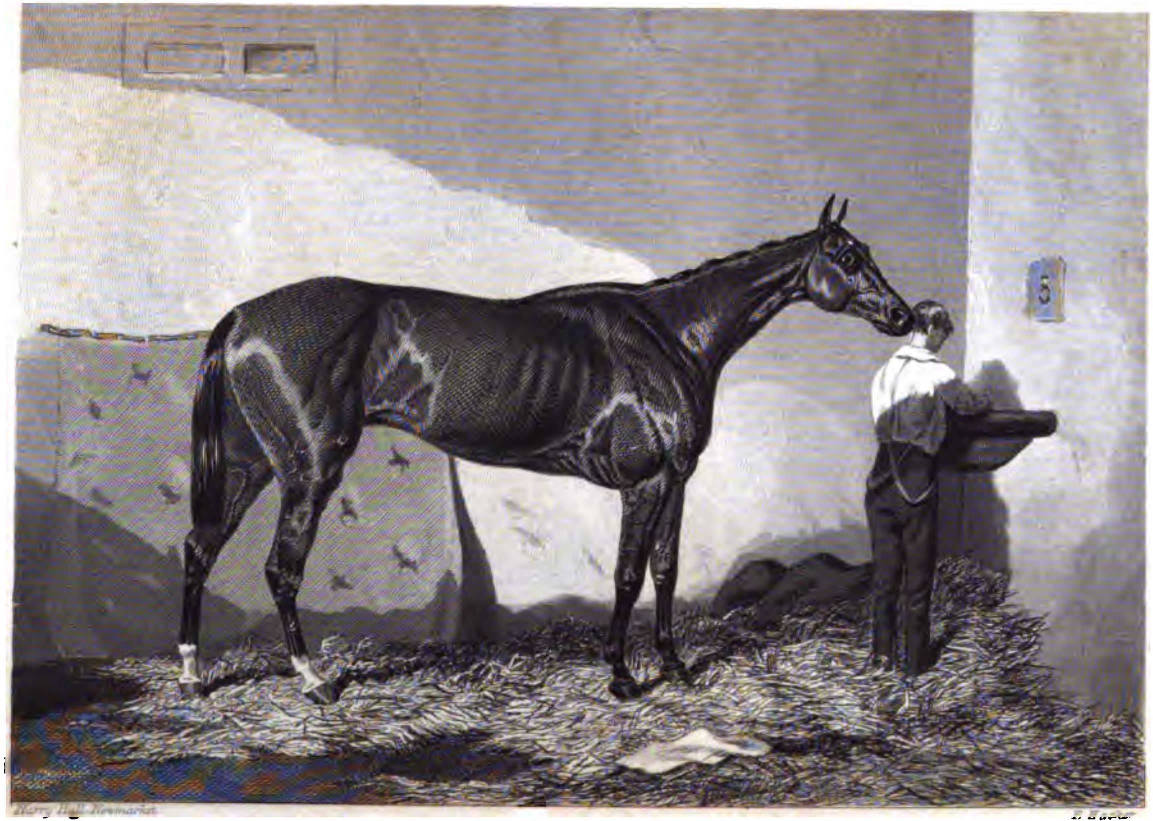

Harry Hall, Newmarket. E. Hacker

Mincemeat.

Winner of the Oaks 1854.

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PLATE III.

DEVON STEER.

THE PROPERTY OF HIS ROYAL HIGHNESS PRINCE ALBERT.

The subject of our plate, the property of His Royal Highness Prince Albert, obtained the first prize of Twenty-five Sovereigns as the best Devon Steer not exceeding three years old, at the Smithfield Club Cattle Show, in December last. The Silver Medal was awarded to the breeder—Mr. R. Mogridge, of Molland, near South Molton, Devon. The animal was fed on bean and barley-meal, linseed cake, mangel wurzel, swedes, and hay.

The special correspondent of the "Mark Lane Express" gives the following remarks on this steer which we extract from his very clever and talented review of the animals exhibited last Christmas at the Show, and which appeared in that publication on the 11th of December, 1854:—"This is a beautifully proportioned animal, but small; fine offal, and quality of flesh exceedingly good; his thighs rather defective."

PLATE IV.

MINCEMEAT; Winner of the Oaks, 1854.

Mincemeat, bred by Mr. James Cookson, in 1851, is by Sweetmeat out of Hybla, by the Provost, her dam Otisina (sister to Lanercost) by Liverpool—Otis by Bustard (son of Buzzard)—Gayhurst's dam by Election.

Mincemeat is a light bay filly, with a neat blood-like head, straight neck, good shoulders and back—a little high on the rump, and drooping towards the tail. She has fair-sized quarters, very clean hocks, knees, and legs, but not over large arms or gaskins. She is altogether rather a light-looking mare, and perhaps a better one than her appearance would warrant us in supposing.

TOP DRESSINGS.

BY CUTHBERT W. JOHNSON, ESQ., F.R.S.

The top-dressing of not only cereal crops, but also of grass lands, will in the present season be more than commonly extensive. An unusually late spring, it is true, has materially delayed these operations; but a severe and trying winter has so far thinned the wheat plant, in many soils and in most exposed situations, that the farmer will anxiously direct his attention to the best means of promoting the vigour and enlarging the produce of the plants which still remain. It may then be useful, at such a time, if we carefully travel together over the more recent observations which have been made with regard to the action of these (chiefly) saline fertilizers.

There are one or two primary remarks which pretty well apply to almost all of them; such as that they require a fair amount of rain to dissolve and convey them into the soil, and that they are most advantageously applied in repeated dressings, after a moderate interval, rather than at once. It is desirable, however, that the agriculturist should seize the happy moment to apply the top dressing when the greater portion of the winter rains are over; for it will be well to remember—as has been well shown by the observations of Mr. J. Dickenson on the chalk soils of Abbotts Langley, in Hertfordshire, during a period of eight years (*Jour. Royal Ag. Soc.*, vol. v., p.151)—that of a fall of rain between October 1 and April 1, equal to 13.95 inches, only 3.56 inches evaporated; but 10.39 inches (equal to about 1,039 tons of water per acre) filtered through and drained away from the land, of course carrying away a portion of the saline and other soluble matters of the soil. But then he found that of the rain which fell from April 1 to October 1, equal to 12.67 inches, only 0.99 inches filtered through and drained away; the remainder, equal to 11.77 inches, being evaporated. We see, then, why the experienced farmer defers his top-dressing till the danger of having his fertilizing salts washed away is past. Nature, in such manurings, again gives us a hint. She has ever been top-dressing our crops; although it is only recently that chemistry has taught us that in every soft falling shower a minute portion of ammonia descends, and thus diffuses fatness over our fields. This interesting fact was thus alluded to by Mr. Pusey in one of his latest papers on agricultural subjects (*Jour. Roy. Ag. Soc.*, vol. xiv., p. 374)—essays which our readers will rejoice to hear he will be yet spared to continue for the good of agriculture. It was when chiefly discussing the comparative merits as top dressings of cubic petre and guano, that the late president of the Agricultural Society of England remarked—

"Singularly, indeed, while we are discussing the question, it has been discovered at Paris that nature supplies to plants both forms of nourishment indifferently in every shower. Our English chemist Cavendish showed, in 1781, that the electric flash *might* produce nitric acid in the atmosphere. Liebig has since ascertained the actual existence therein of ammonia. Monsieur Barral, having examined the rain water collected at Paris last year and the year before, has found in every shower an amount of each substance, reaching in the course of a year the following quantities severally per English acre:—

	lb.		Nitrogen. lb.
Ammonia	12.29	=	10.69
Nitric acid	41.24	„	10.12

"Still this large amount of manuring substance might be derived by the atmosphere of Paris from the smoke and the fœtid exhalations which float above every great capital, and much doubt was accordingly felt by continental chemists on the whole result of the investigation. It seemed desirable, therefore, to repeat the experiment in pure country air. Accordingly rain water was collected by me last October at this place, which is remote from any large town, except Oxford, from which the wind did not blow while the showers took place. It was analyzed by Professor Way; and, supposing our annual fall of rain to be 28 inches, the amount of manure yearly poured down from the clouds on our soil would be larger than even at Paris. For it would stand thus:—

	lb.		Nitrogen. lb.		Nitrate of Soda. lb.		Guano without Phosphates. lb.
Ammonia	28.59	=	23.54	=	159.3	=	164
Nitric acid....	68.91	„	17.88	„	121	„	124.6
Annual downfall of manure per acre			41.42	„	280.3	„	288.6

But the labours of Mr. Pusey were not confined to the comparative merits of two valuable manures: he saw the importance of regarding the period of the year when the manure is applied, and he examined the question experimentally at Pusey—trials which can hardly be too carefully regarded by the young farmer. He remarked to the readers of the Journal: "There are two modes of supplying wheat with pulverized manures — autumnal drilling and spring top-dressing. An experiment tried here this year throws some light upon both methods, and may be the more useful, as involving the total failure of one. The trial ground had been purposely exhausted by white crops for three previous years. Four different manures were drilled with the wheat in the autumn; one-half of each lot was dressed with nitrate and salt, at two dressings, in spring. The produce was threshed out on the field, separately, after harvest. Contrary to the experience of others, and to my own, upon the same land, none of the drilled manures took any effect. The soil is a sandy loam, and they must all have been washed down by the unusual rains. But the spring dressing with nitrate took a singularly powerful effect, as the following table will show:—

Turns of the Drill.	Manure.	Cwts.	Yield on undressed 2½ Acres. Bushs.	Yield on Top-dressed 2½ Acres. Bushs.	Increase by 2 cwt. Nitrate. Bushs.
10	Guano......	3	6¼	13	—
10	Blood......	3	6¾	12½	—
10	Rapedust ..	6	4⅜	11¾	—
10	Nitrate	3	5⅛	11¼	—
2	Nothing....	0	1	2¾	—
Five acres.			23⅝	51½	27⅞

"It will be seen that the natural produce of this land is very low—only 9 bushels of wheat per acre;

and that, owing to the season, the drilled manures were all but thrown away. The profit by the top-dressing of nitrate was, on the contrary, exceedingly high. On about 2½ acres of wheat 2 cwt. of nitrate and 4 cwt. of salt, costing less than £2, it gave about 3½ qrs. of grain, which, at 57s., sold for nearly £10—in exact figures, £9 17s. Last year I ventured to say, that if nitrate could be reduced in price by one-half, a large additional home supply of wheat might be grown at 12s. per qr. This year, at the same price of nitrate, these extra 3½ qrs. stood me in less than that sum. It is curious that poor land, producing merely 9 bushels per acre, was enabled by 90lbs. of nitrate—costing, with the salt, 15s.—to grow 20 bushels per acre. So great an increase is, however, exceptional; nor would it be safe to take the average increase of wheat by the use of nitrate at more than 6 bushels per acre, but the poorer the land the greater will be found its efficacy."

This very useful and seasonable inquiry has, within these last few days, formed the subject of a discussion at a meeting of the members of the Highland Society. At this meeting, two excellent Scotch farmers gave the results of a series of trials, in which Professor Anderson had assisted, and, in fact had suggested, experiments, which seem to have been carefully arranged, and well carried out by this little band of inquirers after truth. The manures employed were nitrate of soda, sulphate of ammonia, Peruvian guano, and common salt—sometimes simple, sometimes mixed together. These were applied to wheat, to grass, and to potatoes, with results, however, not so similar as is desirable. In the trials with wheat, the results per acre of I., those of Mr. Finnie, of Swanston, and II., of Mr. Hope, of Fenton Barns, will be found in the subjoined table. In the trials of Mr. Finnie, the gross produce per acre is given in quarters and bushels; in those of Mr. Hope, the increase in bushels per acre, compared with an unmanured portion of the same field:—

	I.	II.
Nitrate of soda, 112 lbs.	5 3 ..	
Ditto, and common salt, 224 lbs...	5 5 ..	3
Sulphate of ammonia, 87 lbs.	5 4 ..	
Ditto, with common salt, 224 lbs.	5 2 ..	5
Peruvian guano, 137 lbs.	5 6 ..	3½
Ditto, and common salt, 224 lbs...	5 2 ..	
Nitrate of soda, 37 lbs... Sulphate of ammonia, 29 lbs... Peruvian guano, 46 lbs...	5 5 ..	
Ditto, and 2 cwt. of common salt..	6 2 ..	

In considering the results of these and other valuable experiments upon saline top-dressings, our readers will not omit to remember how great and varying is the influence of wet or dry seasons upon such applications. The greater number of these are indeed most beneficial in wet seasons; they seem to act with very diminished power in dry springs and summers. But, do we always sufficiently consider this fact? Ought we not, in examining the results of such instructive experiments to constantly have the rain-gauge register before us? Do we all remember how strangely the depth of rain varies in different seasons? take the last five, for instance, when, in the neighbourhood of London, the depth was in 1850, 19.7 inches; in 1851, 20.5 inches; in 1852, 34.2 inches; in 1853, 24.37 inches; and in 1854, only 18.92 inches; so that 1500 tons of water per acre fell in the year 1852 more than in 1854. How superior an effect is produced by most fertilizers in wet seasons is well known. The users of sprats and of rape-cake are well aware that in a dry season they are often worse than useless; the employers of guano, and soot, and gypsum, all tell us to "sow it in the rain."

The good effects produced by *a mixture* of various fertilisers has never, we think, obtained that careful consideration which this branch of the inquiry deserves; and yet many facts should surely lead us towards such a path; the very great advantage, for instance, of using common-salt mixed with soot, rather than by itself, for carrots and potatoes, is well known; and, some time since, Professor Johnston, and Mr. Fleming, of Barrochan, illustrated the advantage of this inquiry by a series of valuable experiments. The Professor found that, in a field of 40 acres of potatoes, which had been manured throughout with 40 tons of farm-yard dung per acre, a top-dressing of various salts gave the subjoined increase of bulbs (*Quar. Jour. Agri.*, 1847, p. 602):—

Nitrate of soda (cubic petre)	3¼ tons.
Sulphate of soda (Glauber salts)....	0
One-half of each	5¼
Sulphate of ammonia	1¾
Sulphate of soda	0
One-half of each	6¼
Nitrate of soda	3¼
Sulphate of magnesia (Epsom salts).	¾
One-half of each	9¼

In the more extensive trials of Mr. Fleming, in Renfrewshire, in 1846, the potatoes were planted on the first of June, and top-dressed on the first of July. The produce from these various saline applications was as follows (*Trans. High. Soc.*, 1847, p. 28):—

Farm yard dung,	30 tons	10 tons 2 cwt.
Farm yard dung, Sal. ammoniac, Epsom salt, Glauber salt	30 tons 1 cwt. 1 cwt. 1 cwt.	11 " 19 "
Farm yard dung, Cubic petre, Epsom salt, Glauber salt,	30 tons 1 cwt. 1 cwt. 1 cwt.	13 " 7 "

Farm yard dung,	30 tons	14 tons 19 cwt.
Sulphate of ammonia,	1 cwt.	
Glauber salt,	1 cwt.	
Epsom salt	1 cwt.	
Farm yard dung,	30 tons	15 ,, 2 ,,
Peruvian guano,	1½ cwt.	
Epsom salt,	1 cwt.	
Glauber salt,	1 cwt.	
Common salt,	1 cwt.	

With one more warning, I will conclude. Remember, in all your trials, that it is for accurate knowledge that you are striving; and that to attain this you must be not only vigilant in guarding against any interference with your trial plots, but that in all cases you should as much as posble ascertain and note the cost and the return. Above all, as a primary foundation, be well assured that your fertilizers are what you intend them to be, and not adulterated compounds; and then, with these precautions, there need be no fear but that the blessing promised to those who earnestly labour after truth will attend you, and that after not many days you will find your reward in the deepening tints and enlarged produce of the hill-sides and the alluvial soils with which our land so happily abounds.

GENERAL PRINCIPLES OF MANURES.

BY J. TOWERS, P.H. CH., M.H.S.

These very important substances have been so repeatedly treated of under the term *fertilizers*, that it might be thought superfluous to write another line upon the subject. However, if I am not much mistaken, the hope may be indulged that in offering to the enlightened readers some extracts from a treatise on *manures and composts* (drawn up by myself), embracing a period of many years, some facts may be brought to light which have not been appreciated by cultivators in general. It will be sufficient to class the manures under three heads—1. Those termed *mineral*; 2. Those of *animal* origin; and 3. Those termed *organic*—as comprising substances produced from beings that have been endowed with a vital principle.

1. *The pure or simple mineral earths*, which constitute the basis of a good *staple*, are siliceous *sand*; *alumina*, the basis of clay; carbonate of lime (*chalk*); *iron*, combined with a certain but variable proportion of oxygen. Such a simple staple *was* formerly deemed inadequate to support vegetable growth; but a few years since, the fact was announced and proved by Professor Way, that the simple earths possess the extraordinary power of attracting and fixing *ammonia*, and also of destroying the fœtid odour of stale liquid manures, when poured upon the surface-soil of a garden-pot.

Earths of the above-named temper, when duly supplied with manure, are with us called *soil*: in Scotland they assume the name of *loam*; for while destitute of organic matter they enjoy no such distinction. It was the opinion of Davy that chalk has no action on inert vegetable matter; but Mr. Ruffin, of America (where lime is of rare occurrence), has, however, shown in his able treatise on *calcareous manures*, that chalk becomes a prime agent of fertility in all lands wherein vegetable acids abound. Here in Britain it is proved that when chalk is spread over a broad surface, in autumn it becomes charged with absorbed rainwater, which, when frozen, increases in bulk, and thus, when thawed, breaks up the chalk, and reduces it to small particles. As rain-water contains some *ammonia*, the divided carbonate of lime carries with it some of that element also.

Quick fresh-burnt lime should be used (where inert vegetable fibres abound) in the proportion of one-fifth of the inert substances; and above all, where the land is surfeited with old rank dung or *humus*—that favourite of Liebig, on account of the *carbonic acid* which, he believed, formed an atmosphere of gas that was absorbed by the young green parts of plants as their food, and became the origin of their future woody fibre. The complete investigation of the electro-chemical agency of lime would, however, require too much space to be now approached.

2. *Manures of animal origin* were supposed to require but little or no chemical preparation, as they are more liable to decomposition than are vegetable substances. Among their components are muscular flesh, fish, bones reduced to fine powder, hair, woollen rags, feathers, blood, night-soil, and soot. Our treatise says nothing of guano, which claimed little notice till about the year 1844. Were it not for the disgraceful practice of adulteration, that most comprehensive of all auxiliaries would be confidently employed in the stimulation of the root crops.

I have repeatedly tested several sorts of guano—the Bolivian, a first-rate Peruvian, the Ichaboe, and Saldanha Bay—and proved the superior excellence of the Peruvian, and comparative worthlessness of the two latter sorts. I also suggested the feasibility of an attempt to prepare a potent representative at home, by combining the secretions of poultry with the offal of fish, thus obtaining bones reduced to that astonishing degree of fineness in which it exists in the best guanoes. We have lately been told of some attempt to manufacture a fish manure; but the process cannot be made available unless the excreta of birds be added to the compost. Saline phosphates, sulphates and chlorides of the alkalies (all soluble) and a superfine solid bone phosphate, must be combined, if hope of success be reasonably entertained.

3. *Vegetable organic manures.*—These comprise all green vegetable substances that, when heated, and exposed to the atmosphere at a temperature from 55 to 80 degrees, will speedily absorb oxygen, and evolve elastic fluids such as carbonic acid and some hydro-carbons. As such decaying portions of plants are usually added to the masses procured from the stables and farm-yard, they are indiscriminately blended with the excrement of horses, cattle, swine, and poultry; and thus, in fact, a mixen of a compound vegeto-animal character is finally produced.

Fermentation of farm-yard manure.—Great difference of opinion exists on this subject. Some continue to advocate the full exposure of the mass over the surface of the farm-yard, and yet regret the loss of the brown sullage that flows away, and is entirely wasted. Others prefer the dung that is prepared and compressed in pits under cover by the feet of the animals. *Extreme and protracted fermentation is injurious*, unless in the case of preparing black spit dung for the garden. It were better in most cases of deep tillage to bury fresh-made stable-dung deep in the ground, where the exhalation would rise and be absorbed by the pulverized earth above it; or to adopt the form called the *Norfolk pie*, used by Mr. Coke, of Holkham. The dung is taken from the folds, stable, or cattle pits, laid in great masses, is compressed by carting over it, and then is covered with a deep stratum of sound earth, by which the gases are absorbed and fixed according to the now-acknowledged principle of chemical attraction.

THE SELECTION AND CULTURE OF TURNIP SEED.

To obtain, and preserve from intermingling, a true Stock of good Turnips is of great importance to every farmer; and but few know what course to pursue to insure good seed from a well-proved variety, or care much about the subject, generally confining themselves to a purchase from the nearest seedsman or market gardener, who, in his turn, receives his usual annual supply from his "London seedsman," from "the old stock," which, in reality, is in a great measure literally too true, it being sufficiently notorious that "old stocks" are continually mixed off, to the no small loss of the growers. I have more than once lost a crop, in my early days of business, from this cause; but, since I have adopted the practice of growing my own seed, I have never lost one, or indeed had a defective crop; and this plan I have followed for many years, so that my "stock," from careful selection and close attention, has become well known, and long been in high favour in many districts.

The stock of any peculiar variety, if really good and hardy, should not be crossed with other like stocks; but if defective in any one point, *i. e.*, size, form, colour of flesh, quality, hardiness, habit of growth, quantity of top, length of neck, &c., &c., it may be profitably crossed under judicious care. I have grown in competition many varieties, in separate rows, alongside each other, both of the Swedish and common sorts (having, on one occasion, twenty-four Swedish varieties, besides many of the common varieties), taking care to note their peculiarities: and my judgment has, at last, settled down upon two principal varieties for my own growth: the Purple-top Swede, improved by myself, and the Red Round or Globe, from a known stock of fifty-five years' standing. The Swedish variety is a cross from a very hardy and well-formed globular stock, with the best-formed and largest bulbs of Skirving's first new stock; combining, therefore, the advantages of both. The Red Round is of hardy growth, buries itself deeply in the soil, and produces a heavy crop. Both varieties are of excellent quality of flesh. It may be thought unimportant to the general reader to name these matters, but it is surprising to what extent growers will go to obtain first-class stocks, and at great expense. I once saw a large and beautiful bulb of a purple Swede variety, from which the grower was about to obtain a stock, and for which he assured me he would not take £100. This individual did subsequently show some fine specimens at the Smithfield Club Show, and his stock has long stood deservedly high.

There are so many good "stocks" throughout the country, that it would be invidious to name any single one; but it does behove farmers to look closely after a good stock, and to procure growing seed, come from whence it may. It is not desirable to be seed of the first year, the second year is better; it is more liable to run wild, and not to bulb. Seed will, if kept well, grow freely in the fourth or fifth year; but never sow without trial, if it is old.

The common practice of procuring seed by the London houses is, to have it grown by contract. The seedsman finds the seed, and the grower is bound by contract to deliver it, in marketable condition, for a certain price per bushel, subject to the supervision of the seedsman during the period of growth.

The district of Romney Marsh, in Kent, is the most resorted to by the London houses, and as much as 2000 acres of seed are said to have been grown there in one season. The usual course is to sow the stock on the hills, and take the plants into the marsh to set. This is called transplanting, and is indeed to be preferred. Many, however, prepare the soil, and merely drill in the seed, taking care to look the plants carefully over in flowering time. I do not attach such great importance to the system of transplanting the bulbs as is generally given to it. It is often adopted from convenience, as giving more time to prepare the soil. The stock may be kept equally true by the ordinary drill course, under judicious care. The great thing is, to prevent intermixture and inoculation: hence, no two similar varieties ought to be grown near together. Swede seed may be grown near to a common variety, without much danger, as the latter sort will be mostly out of flower before the Swede comes in. It is, however, best to be far apart in all cases, as bees are very industrious inoculaters, and in this kind of propagation work injuriously.

Cultivation and Management. — I shall detail my own course of management of this crop throughout, which, I think, will suffice for every useful purpose, although, in minor points I may differ from others.

Soil, &c.—This should consist of good strong loam; but rich soil of any kind will produce a crop. It should be prepared in the autumn, by deep ploughing and pulverisation, but not reduced to too fine a tilth. A somewhat open state, so as not readily to run together from heavy rains, is best.

Selection of Bulbs for Stock.—To keep up a good, a regular, and true stock, I select from the field crop of turnips as many of the best bulbs of like character and form with the stock I cultivate as I require; and occasionally (as this year) I obtain a renewal of my stock from a single turnip. These are planted in a square or plot to themselves, in the midst of the general crop, taking care to have the intervals wide enough to prevent the intermingling of the pollen. From this "best selected," I grow my own crop, out of which my selection is again made, year by year. By this course, not only a uniform, but an improved stock may be kept up. It would be better to grow this "best selection" elsewhere, if freedom from inoculation could be insured. I find, however, small plots are in this way most injured, and have, therefore, adopted the above course, *i. e.*, to plant them in the midst of the general crop. They are but slightly affected in this way—generally true to their stock.

Plants for Transplanting.—In the early part of August, I prepare a large seed bed, or plot of ground, sufficiently large upon which to grow the number of plants I require for transplanting. An acre of land well filled with young, strong plants, will transplant a large breadth, possibly 15 to 20 acres. The land should be brought to a fine tilth, as for turnips. I sow from the stock of my "best selected;" and if nicely sown, or equally drilled, and not too thickly, they will not require further attention till the season for transplanting. If they come up too closely, they will require thinning, as it is necessary to have a good bulb to eachplant: but a small one, of walnut size, will suffice.

Transplanting.—The season for transplanting may be taken to be any open weather prior to the month of February, and even in that month I have succeeded; but the operation ought to be completed in November, or earlier if convenient, as the more the plants grow before the severe weather sets in, the firmer hold have they upon the soil, and the greater is their safety. My practice is, to plough the prepared land immediately before setting, in about ten-inch furrows. When all is in readiness, and the weather suitable, I carry the whole operation on together. The bulbs are drawn and planted the same day. In setting, each setter is attended by a lad, who, carrying a quantity of plants in his basket, carefully deposits one in each hole, or rather cleft made by the setter. The setter, with his spade, advancing along every alternate furrow, makes a cleft at about 12 to 15-inch intervals, according to the size of the plants—the larger the plants the wider the interval. With his foot he closes one cleft upon the plant as he advances to make another, and in this way he proceeds expeditiously and satisfactorily. In dry, open weather during the winter they should be looked over, to see that all the plants are fairly earthed up, and all vacant spaces renewed. Early in the spring they should be well hoed and cleaned, and the bulbs kept firmly pressed to the soil by the foot, if needed.

Flowering.—This is an important part of the management, and if neglected many evils arise: bastards and intermixtures will show themselves in succeeding crops. Like many secrets in business, this is simple enough when known. Yellow-fleshed turnips produce a light pale yellow-coloured flower. White-fleshed sorts, a bright deep gay yellow colour. This is the chief distinction. All bulbs, therefore, bearing a flower differing from the general stock must be pulled up and destroyed as soon as they appear. This will require almost daily attention, as the pollen would, immediately on appearing, inoculate its neighbours. The common varieties of white-fleshed turnips produce the same coloured flowers. The detection of Red Rounds amongst White or Green Globes is, I believe, out of the question—it must be detected in the setting; but yellow-fleshed turnips, particularly Swedes, are easily seen; but the Scotch yellows, and some of the hybrids, are with difficulty detected.

HARVESTING.—The period of ripening is from the latter end of June to the beginning of August, according to the variety. Swedes are the latest sort. The ripening may readily be known by the change of colour. A good rule is this, when the undergrowing pods are of a deep-purple colour, the outer-growing pods will generally be dead ripe. The whole may then be cut. My practice is to cut the crop into reaps, and tie them into small sheaves. If the weather is hot and fine, I generally thrash from the field; but if unsuitable, I put the crop into stack in the same way as the mustard crop, *i. e.*, commencing with a round shock in the middle of the steddle, and laying round to the outside. In this way the stack may be built so as to allow the bottom end of the sheaves at all times to droop downwards, so as to shoot off rain.

THRASHING AND DRESSING FOR MARKET.—The thrashing may be either by flail or machine. I prefer the flail, as less is thereby split. On a large cloth, five or six flails will thrash much seed in a day; and dressing may most advantageously proceed at the same time. This I generally complete with proper seed sieves by aid of wind only, as but few dressing machines are well calculated for dressing seeds properly. Of course it will require passing through the sieves till it is well dressed. The sieves I use are of wire; the meshes, from four to eight strands to the inch. A common corn-riddle will do to separate the seed from the cosh. The seed, if thoroughly dry, will keep well for years in sacks; but if in the slightest degree damp, it is best to let it remain in stack till the following spring.

P. F.

THE BENEFITS RESULTING TO THE PUBLIC IN GENERAL, AND TO THE AGRICULTURISTS IN PARTICULAR, FROM FARMERS' CLUBS AND OTHER AGRICULTURAL ASSOCIATIONS.

Each one of us has his favourite weapon. From the polished sword and keen repartee that play so gracefully in the hand of the accomplished master of fence, to the sledge-hammer blow of the matter-of-fact hard hitter, we all know pretty well where our power is centred. The knight-errant, to be sure, poises his lance against all evil doing, asking no further aid than the consciousness of his own good cause can give him. Others, again, more prudent if less sanguine, seek to combine their strength, and to attain by union what they could hardly hope to carry unassisted and alone. In either instance, however, the watchword must be the same. Whether we hoist our standard as the signal for thousands, or essay single-handed to fight our way, we must alike feel strong in the virtue of a good cause. With this to nerve our arm, and fix our gaze, we may do something; as, without it, we shall achieve little or nought.

We need scarcely stay to inquire into the justice of that cause we advocate. The claims of agriculture are now manifest enough. We may yet seek to ascertain by what means these may be best enforced and advanced—what, in a word, should be the farmer's safest weapon? Hercules, the very model of a hero who helped himself, is always associated with one especial agent of success. In action this was ever ready at his side, while in peace he still learnt to lean upon it. Through all his labours and difficulties, what would Hercules have been without his club? May we avail ourselves of so excellent a precedent, and, with no great stress of imagination, turn the tenant farmer into another Hercules, and ask him also to use his club. He will find no other such weapon fitting to his hand, and none that he can wield with such advantage and effect. We believe, indeed, that he is becoming day by day more alive to this, and that few now would question the benefits to be derived from such a system of union. If there be any, we would refer them at once to the Farmers' Clubs themselves for an answer; or, should this be too much to expect, we are enabled to find something even still more direct and definite. What Farmers' Clubs generally have accomplished, one in particular has volunteered to tell us.

We give following this the prise essay, complete, of the Oxford Farmers' Club. As the first of a series, this is very appropriately devoted to the consideration of what such institutions have done, or are susceptible of doing. Without one word of positive dissent, and scarcely any material qualification, we can very justly compliment the Oxford Club on the success of the effort. The essay is really worthy of the subject, and we do not think we could give it a higher recommendation. No one will read it without being struck with the research of its author, and the happy power of combination he has at his command. There is not an important point in the history of our national societies in any way connected with agriculture, but that he has touched on. There is not a feature associated more especially with the proceedings of his own club, but he has a word for it. It is a paper that might, and no doubt will, be read in every club in the kingdom; and yet it is essentially what it professes to be, the Essay of the Oxford Farmers' Club.

It is not our purpose to follow Mr. Plowman through the many different bearings of his subject. We would prefer, rather, that our readers should each one do this for himself, and this he may do without any great call upon him. The essay has one advantage that cannot fail to increase its effect. It is not too long—the besetting sin of nine out of ten treatises that ever took the cultivation of the soil for their text-word. And yet this is a suggestive theme, too. More, no doubt, might be said on it, especially in matters of detail; and yet we would hardly ask for more. Different circumstances, position, and means must always regulate details, and we cannot help thinking the author has done wisely in treating his subject as generally as it was worded on the card before him.

It may be argued, further, that we have nothing very new here. The history of this society, or the principles of that, may be already known to most of us—that the Royal Agricultural Society seeks to combine "practice with science;" that the London Farmers' Club has distinguished itself by its advocacy of the tenant-right and corn-average questions, and that the Highland Society has provided very useful machinery for the collection of agricultural statistics. All this some of us, no doubt, were aware of; but did we turn our knowledge to the best account? Did we even try to remember what good had been achieved? We are afraid there are too many who have not; while we trust the tone of Mr. Plowman's paper will imbue them with a better spirit. Farmers' Clubs, perhaps, more than any institutions in the kingdom, have suffered from this want of sympathy. Men that still cannot help benefiting by what is being done, stand aloof, and only sneer at those who are wild enough to work for the good of themselves and their fellow-men. It is surprising how many of these "I'll do nothing, but grumble at everything" might be found; and it is to such more particularly that we would recommend the Oxford prize essay. It will teach them to think more liberally, and to feel, we hope, a little more gratefully towards those who do combine to uphold the cause of agriculture.

That even these will gradually come round we have now little doubt. Never did association of this kind promise so well as it does just at present; and it is only success that is wanting to secure the services of many waverers and cavillers. One great impediment to this is not only removed, but its influence almost forgotten. The civil war which so long raged here diverted our funds and attention from Agricultural to Political Societies. Many a local club and association so died out, or lived on with a little more than a mere name to boast of. But these troublesome times have passed away; and clubs are now springing up again, with a far better chance of succeeding than they ever previously enjoyed.

In their re-organization there are one or two points that must never be lost sight of. Imprimis, with the farmers themselves should rest their entire management, and chief support. Patrons and patronage have rarely but a depressing influence, while the presence of glib, mouthing orators, who are seldom farmers, is an evil yet more carefully to be guarded against. The *effect*, after all, of these meetings must come chiefly through the press; and many a reporter has closed his book, as an editor would his columns, in the face of a windy oration from the professed speech-maker. "Farmers' clubs," in the words of our essayist, to be useful, should be "eminently practical."

One word, in conclusion, to the Oxford Farmers' Club. We see it purposes to have a series of these prize essays, the competition to be confined to its own members. Now, while admitting to the full the successful beginning it has made, we doubt very much whether this can be continued. The secretary, it will be seen, generally a gentleman of some power with his pen, carried away this premium. May he not be too much in another trial, or will those once beaten care to try again? For our own part we confess that we think the great value of farmers' clubs, as an agent for improving the mind agricultural, will be ever found in open discussions and good reports.

OXFORD FARMERS' CLUB PRIZE ESSAY.

BY MR. JOSEPH PLOWMAN, Secretary of the Club.

The subject selected for the first Prize Essay of the Oxford Farmers' Club is of that comprehensive nature, that to enter into all its bearings would extend the composition to a length which might defeat the original intention of the Club, and render it less likely to be perused by its members and the public. Under these circumstances, the writer has deemed it advisable to content himself by examining certain principles, and showing, by a cursory glance on the mode and result of their application, how far they bear upon the subject which has been selected for this essay.

The principle of mutual association and co-operation has, in all ages, and under every circumstance, whether of a public or private nature, been found most advantageous, and that truth is now so generally recognized, that it has become a predominant feature in our social system. This is strikingly developed in the present day, because in every branch of study, whether of science, literature, or art, the principle of association and co-operation is the basis and foundation upon which each rests. It is this which gives stability and effect to the various societies which exist for the advancement of particular branches of study, forming as it does a nucleus and a point to which men, eminent in each, bring their experience and the result of their investigations to bear, and thus, by comparison, to contribute to the elucidation of truth. There is scarcely any great result, which has tended to advance civilization, to spread refinement, and promote the social and physical welfare of mankind, which has not been mainly owing to the efforts which have been made and concentrated by societies established for the purpose of carrying such objects into effect.

The munificence of founders and benefactors, in reference to our Universities in particular, together with the grants voted by the nation in aid of various public societies, to say nothing of the stream of benevolence flowing from private sources, through the channels of the various societies, religious, moral, scientific, literary, and artistic, which exist throughout the length and breadth of the land, and the system adopted by great mercantile bodies and joint-stock companies, may be regarded as a recognition of the principle of co-operation, and as a striking testimony in its favour. Notwithstanding that so much practical good has resulted from the formation of societies for the advancement of various studies, it appears an anomaly that one of the most important of all sciences, namely, that of agriculture, which embraces and depends upon so many others, which is the precursor of all the arts of civilization, the foundation of commerce, and the basis of national wealth and greatness, has, until a comparatively recent period, struggled on unaided, and without that systematic co-operation which has given such a stimulus to every other. A science, upon the right understanding of which, the cultivation of the soil of a country, and the maintenance of its people so materially depend, cannot but be one of deep and vital interest to all classes of the community. The increasing of the comforts and conveniences of life, the advancement of commerce, and the elevation of society, by diffusing a love of art, are of themselves laudable objects, and deserving of every encouragement which the mind and energies of man can bring to bear upon them; but all these must yield in importance to that paramount subject, the cultivation of the soil, upon which the human family is located, and to which it must look as the only resource for the supply of its daily food. The prosperity of a country, its resources, the moral and social happiness of its people, and its position in the scale of nations, depend so much upon the facilities afforded for the subsistence of that people, that it is difficult to assign a cause for that indifference which, until a comparatively recent period, has been evinced towards the study of agriculture, and for that length of time which has been allowed to elapse before it was recognized and treated as a science. Without entering into the various causes which may be assigned for this neglect, it will be sufficient for our purpose to review the steps which have been taken in order to raise the science of agriculture to the position which it now occupies.

In this country the first important step which was taken in that direction was in 1793, when the late Sir John Sinclair succeeded in getting established and incorporated, "The Board, or Society for the Encouragement and Internal Improvement of Agriculture." That society effected great good by obtaining a survey of all the English counties on a uniform plan, the effect of which was to develope more rapidly the agricultural resources of the country. It also gave further proofs of its usefulness by suggesting, and as far as lay within its means, providing remedies for the dearth and scarcity which prevailed at the end of the last and the beginning of the present century, by collecting information and making reports to the Government on the state of the crops. The statistics thus collected by this Board at that, as well as at other times, were made use of by the Ministers in power, and doubtless had their weight in connection with the subject of taxation.

That society was also practical in its operation, inasmuch as it encouraged experiments and improvements in agriculture by giving prizes, and exercised considerable influence over the provincial societies up to the time of its dissolution in 1816.

Although it was not until 1793 that a charter was obtained for the incorporation of the members of the Administration and other eminent men into a board of agriculture, and that this might be regarded as the first great national movement on that subject, it is but just to state that 70 years previously, namely, in 1723, there was a society established in Scotland, entitled, "A Society of Improvers in the Knowledge of Agriculture," and that its transactions were published. This society becoming extinct, was succeeded by another in 1755, and in 1784 another was established, entitled, "The Highland Agricultural Society of Scotland," which stands in the same relation to Scotland as the Royal Agricultural Society does to England, and its constitution and proceedings are very similar.

The Highland Agricultural Society of Scotland received a royal charter in 1787, its objects being at that time comparatively few, and of a purely local nature. Its operations, however, were not restricted to the Highlands, but were extended to the Lowlands of Scotland, and directed to the promotion of the science and practice of agriculture in all its various branches, and in accordance with its enlarged sphere of operation it received another royal charter in 1834. The extent and influence of that society may be judged by the following facts: Premiums amounting to upwards of £2,000 a year are awarded for reports on every subject connected with the improvement and cultivation of the soil and the rearing and feeding of stock. Encouragement is offered for the management of the dairy, the growth of timber, and useful inventions in agricultural machinery, while the comforts and convenience of the labouring classes are promoted by stimulating proprietors to improve the construction and increase the accommodation of their cottage dwellings. It combines, too, at the present, something of the Royal Agricultural Society of England and the Smithfield Club, having a show of breeding stock in the summer and of fat stock at Christmas. Its progress and importance have increased with its age; its objects have been well directed and carried out, and have thus secured for it the united and cordial support both of landlord and tenant; besides which, it has given an impetus to the whole of the local agricultural societies and clubs which abound in such numbers throughout Scotland. As a further proof of its value, it has been employed by Government to prepare a complete report of the agricultural statistics of that country.

It is also deserving of notice that an Agricultural Society was established in Ireland in 1747, and it has given rise to many others which rank equally high with those of Scotland and England. There was also in England, in 1777, a society entitled "The Bath Agricultural Society," and the publication of its transactions have done much in promoting agricultural improvement. Its title is now changed to that of the Bath and West of England Agricultural Society, which has become one of the most important and flourishing in the whole kingdom.

The next important step taken to advance both the science and practice of agriculture was in 1838, when the Royal Agricultural Society was incorporated; and it may be truly said that from that time a new era commenced in the history of institutions for the improvement of agriculture, inasmuch as it not only revived the spirit of existing associations, but led to the formation of a large number of new ones. That society adopted for its motto, "Practice with science," and by enlisting in its ranks the most eminent scientific men and distinguished agriculturists, availing itself of their services, and by issuing publications, in which the best talent is employed, carrying on an extensive correspondence at home and abroad, and by the encouragement which it holds out for improvement in every department of agriculture, it has become, in every sense of the word, a national institution, and has not only acquired additional stability by a constant increase of supporters, but has yearly extended its sphere of usefulness.

The objects of the Royal Agricultural Society, as set forth in its charter of incorporation, are—

1st. To embody such information in agricultural publications and other scientific works as have been proved by practical experience to be useful to the cultivators of the soil.

2nd. To correspond with agricultural, horticultural, and other scientific societies both at home and abroad, and to select from such corospondence all information which, according to the opinion of the society, may be likely to lead to practical benefit in the cultivation of the soil.

3rd. To pay to any occupier of land or other person, who shall undertake, at the request of the society, to ascertain by any experiment how far such information leads to useful results in practice, a remuneration for any loss he may incur by so doing.

4th. To encourage men of science in their attention to agricultural implements, the construction of farm buildings and cottages, the application of chemistry to the general purposes of agriculture, the destruction of insects injurious to vegetable life, and the eradication of weeds.

5th. To promote the discovery of new varieties of grain and other vegetables useful to man, or for the food of domestic animals.

6th. To collect information with regard to the management of woods, plantations, and fences, and on every subject connected with rural improvement.

7th. To take measures for the improvement of the education of those who depend on the cultivation of the soil for their support.

8th. To take measures for improving the veterinary art, as applied to cattle, sheep, and pigs.

9th. At the meetings of the Society in the country, by the distribution of prizes and other means, to encourage the best mode of farm cultivation and the breed of live stock.

10th. To promote the comfort and welfare of labourers, and to encourage the improved management of their cottages and gardens.

The effect of such an institution, carrying out its objects so effectually, on the country generally, may in some measure be judged of by the fact, that in seven years from its establishment, although the agricultural societies in the United Kingdom were previously but few in number, yet in 1845 they amounted to about 400.

It also had the effect of giving birth to a large number of those more practical societies, the farmers' clubs, which, in 1845, amounted to upwards of 150; and it is a no less gratifying circumstance, that so far from these clubs being of a temporary and evanescent character, they have not only gained additional strength and importance, but are extending themselves in almost every county. At the present time the agricultural societies and farmers' clubs amount to upwards of 700 in number. The fact that such societies have progressed, and are still progressing, leads to the enquiry why such is the case, and what are the benefits which have already resulted, and are likely to result from them?

The societies, whose operations and influence form the subject of this essay, may be classified under two heads, namely, *Agricultural Societies* and *Farmers' Clubs.*

The benefits which have resulted from them are of a twofold nature—those which they have conferred upon the public in general, and upon the agriculturists in particular. The fundamental principle of these societies is to increase, and thus to cheapen the supply of food, by encouraging improvements in the cultivation of the soil, and in the breeding and fattening of stock.

The former they have endeavoured to accomplish, and have succeeded in an eminent degree, by directing the attention of scientific men to the nature of soils, with a view of ascertaining how far they may be assisted in yielding increased produce by the use of particular manures, and by showing that if the soil is to be cultivated with success, it is indispensable that the cultivator should become acquainted with the natural sciences, with botany, geology, and, above all, with chemistry. The success of every branch of study has been regulated in a great measure by the amount of science upon which practical experience has been based, and although this has been recognized less by agriculturists than by almost any other class of practical men, it is beginning to be felt and acknowledged by them, and is in some measure forced upon them by witnessing the superior success of those who take science as their guide—who feel that it is based on truth, and that truth, when fully developed, and properly applied, is certain to bring with it its own reward.

The effect which agricultural chemistry, so strongly inculcated by these societies, has had upon agriculture, cannot be overrated. It was chemistry which first pointed out the valuable deposits of guano in the west hemisphere, and the extensive stores of fossil manure in our own country; and as it is daily developing some new truth and some new field of action, it is impossible to calculate how much more may be anticipated from it. It is, however, admitted on all hands that, although the principles of chemistry have been applied to husbandry but a comparatively short period, it has already effected an immense saving by the more judicious application of old manures, and by the introduction of new manures, whereby increased fertility has been effected, larger and weightier crops have been obtained, and tracts of land hitherto considered barren and unfruitful have been converted into smiling corn fields, and have thus contributed largely to the supply of food for the population.

The effect of this application of science to husbandry has been to realise larger crops at a comparatively less cost; and by so doing the public have been the gainers, as well as the agriculturists themselves.

Nor could any other result have been anticipated, more especially from the study and practice of the chemistry of agriculture, because it furnished and supplies the knowledge of the constituents of the soil, and of the manures deposited in it; of the plants which grow upon it; and of the animal produce of meat and wool, butter, cheese, and other nutriments into which their vegetable produce is ultimately converted The advancement of agriculture may be said to be in proportion to the union of scientific with practical instruction. The former has been accomplished by the efforts of scientific men, who have devoted their time and attention to agricultural chemistry—in ascertaining the results of meteorological, botanical, and geological observations, in the extension and application of agricultural mechanics—improvements in draining—the introduction of new manures—better irrigation—and a better system and arrangement of farm buildings. The practical instruction has been achieved, in an eminent degree, by enterprising individuals, and by the establishment of agricultural colleges and model farms, where an intimate acquaintance with the proper management of a farm, and the principles which should regulate it, have been acquired. To these ends, also, the Royal Agricultural Society of England, the Highland and Agricultural Society of Scotland, and the Royal Agricultural Improvement Society of Ireland, have directed their energies: the provincial societies have followed in their wake, and, like their prototypes, have conduced greatly to the diffusion of sound information on all subjects connected with practical husbandry.

Acting on the conviction that improved implements is the best proof of the advance of modern agriculture, another important point to which agricultural societies, and more especially the Royal Agricultural Society, have directed especial attention, has been to the preparation of the soil, both for the reception of manures as well as for the seeds to be deposited in it. This it has accomplished to an immense extent by the encouragement which it has held out, and the remuneration which it has afforded for the improvement of agricultural implements, the effect of which has been to raise up, by its prizes on the one hand and its effective tests on the other, a new body of agricultural implement makers, whose talent and workmanship now attract general attention, and constitute the chief feature of the annual exhibitions.

In confirmation of this, the returns published by the Royal Agricultural Society show that from the first meeting in Oxford in 1839, up to the last meeting at Lincoln, the number and variety of agricultural implements have gone on increasing to such an extent that what was at first a minor element in its exhibitions has now become one of its most important features.

The testing of various implements by this Society has also done much towards securing the most economical and the most efficient, and in improving their construction, and, as a striking proof of this, it may be mentioned that where, as in 1849, the prise steam engine consumed 11¼lbs. of coal per hour per horse-power, that of 1854 consumed the smallest fraction over 6lbs. per hour per horse-power; and the Consulting Engineer to the Society (Mr. Amos), in his recent trial of two rival steam engines, found their merits so equal, that the only mode of testing their excellence was by taking them to pieces and awarding the premium to the best made engine.

The introduction of better modes of cultivation, of more efficient implements, and of a better system of rotation of crops, have combined to increase the productive powers of the soil, and to lessen the cost of production; and as the wealth of this country proceeds mainly from the soil, every class of the community has benefited in a greater or less degree by this improved state of things.

The necessity of making the soil more productive than heretofore is rendered the more urgent by the increase of the population, and their corresponding requirements; while its capability is shown by the fact that the result of all the calculations which have been made is that in England, at the present moment, the entire production of the soil is not more than one-half of what it is capable of producing by the application of enterprise, skill, science, and capital. The use of artificial manures, and more especially of guano, is becoming more general; but their application is but of modern date, for the first cargo of bones for manure was landed at Hull about twenty or thirty years ago, and the Custom-house officers were at a loss to know what duty to charge upon it. A deputation waited on the Chancellor of the Exchequer for the purpose of showing how necessary it was that every encouragement should be given to the introduction of anything that would conduce to the improvement of agriculture and commerce throughout the world, and the result was that no duty was imposed.

Another beneficial result which has been produced by these Societies has been the improvement of stock, both in the breeding and feeding; for the object has been not to encourage the fattening of animals to a point which renders them less valuable and useful to the consumer, and more lucrative to the tallow-chandler, but to ascertain how early, by a more judicious system, an animal may be brought to perfection, and thus, by reducing the cost of reaching that point, to give the public the benefit of a readier supply, and at a more economical rate. These results have been attained by a variety of ways, by testing the effects of various foods, encouraging various breeds, and making early maturity one of the leading points of excellence.

As an encouragement for the latter recommendation, it is one of the features of the Smithfield Club, and deserves to be more generally adopted, to award prizes not only to the owners of the most meritorious animals, but also to the breeders of the same, on the ground that, after all, the chief point of excellence, early maturity, depends mainly on the breeder, notwithstanding that much skill and judgment may have been evinced by the grazier.

The principles which have been laid down and acted upon by the Royal Agricultural Society of England have also served as guides to the other local societies existing throughout the land, and such regulations as have been found by experience to work well, and to accomplish the desired end, have been engrafted upon, and been adopted by those societies. By this course of action, the influence of the Royal Agricultural Society has been felt throughout the length and breadth of the land, and so far from its having had the effect of paralyzing the efforts of humbler societies, it has raised their character, and given them increased stability, by showing what its vast resources enabled it to show—the great practical results which are to be obtained by testing the effect of manures on soils, by a more skilful cultivation of the soil, by the application of improved implements, and by a better system of breeding and feeding stock. The beneficial influence of that which may be termed the model and national Society of England has been diffused, although in a less degree, by the local societies, and in some instances, the Bath and West of England Society in particular, with great success; for this society, which, but a few years ago, was "small by degrees and growing beautifully less," resolved to extend its sphere of action, reconstructed itself, and, by widening its basis, has placed itself in such a position that at the present time it is inferior only to the Royal Agricultural Society.

The same course has also been adopted in other counties, in Yorkshire, Norfolk, Suffolk, and Devon, where several agricultural societies have amalgamated, and thus brought their combined influence to bear upon the agriculture of a large district, instead of confining their operations to a more limited sphere. It is worthy of remark, that a similar course has been adopted in this county, by the amalgamation of the Oxfordshire and Banbury Agricultural Societies, two bodies which have found their influence diminishing, and the number of their supporters on the wane; and there is reason to hope and believe that the concentration of the support of the county under one society will have the effect of making it worthy of it, and productive of far greater usefulness, as experience has shown that the utility and success of such societies are in proportion to their extension of action. It would be entering on too wide a field to inquire into the various ways by which the public in general have been benefited by the establishment and operation of the various agricultural societies. Their extent of usefulness has varied, but they have all been actuated more or less by one great leading principle—that of increasing production and lessening its cost. That has been the object aimed at in their exhibitions, their distribution of prizes, in their publications, their essays, and their lectures; and in proportion to their accomplishing that object, they have been considered successful in attaining the great end for which they have been instituted.

We proceed, then, to inquire how far these agricultural societies have been beneficial to the agriculturists themselves.

It must be obvious that where the main object of a society is to increase the produce, and to lessen the cost, there is a benefit to be derived, not only by the consumer, but by the producer, inasmuch as the latter obtains, by increased production, a better return for his outlay, even if the cost of production be increased. It is, however, a leading feature with such societies to show, and to aid the producer in obtaining in the most economical manner, and in applying in the most judicious way, his tillage, as well as in feeding his stock at the cheapest rate, and bringing it to maturity at the earliest possible moment. This knowledge, important at all times, is especially so in the present day, because the producer, whether of corn or meat, has nothing to fall back upon but increased skill and the assistance which science can render him. Of these he has now no alternative but to avail himself, inasmuch as he has no legislative measures of protection to rely upon, but has to compete with the growers of corn and of other crops and produce on soils more congenial, and where the burdens of local and general taxation are comparatively light. It has become with him, as well as with the manufacturer, a matter of the first consideration how he shall cultivate his farm at the least cost, and obtain the best return for his outlay, capital, industry, and skill.

In these respects the agriculturists have derived great assistance from agricultural societies, inasmuch as they have, by their resources, been enabled to make experiments and to arrive at results by a large outlay, which individuals would not have ventured to undertake. This has been accomplished in a variety of ways; and there is scarcely a branch of agriculture which has not come under the cognizance of these societies, and of the Royal Agricultural Society in particular; and the results of their experience and experiments being thrown open to the world, every one engaged in the cultivation of the soil has had the opportunity afforded him of profiting by them. Without entering minutely into the services rendered by these societies, and by the Royal Agricultural Society in particular, by directing their attention to the cause and remedy of diseases of crops and cattle, and to other minutiæ of deep and vital interest to the agriculturists, it is deserving of notice that they have, by the employment of eminent scientific men, rendered great service to that body in protecting them from imposition and fraud in the purchase of artificial manures. By analyses, and the use of certain tests, the pure from the spurious manure has been distinguished, and the most unscientific farmer has been placed in a safer and better position, and is no longer liable to the chance of purchasing at a high price any worthless substance which a dishonest dealer might desire to impose upon him as a genuine artificial manure. To this point the Royal Agricultural Society has directed especial attention; and, by securing the services of eminent Professors, such as Way, Johnston, and others, has afforded, not only to its own members, but to any farmer in the kingdom, the facility of sending a sample of any manure they wish to apply, to have it tested, and its real value ascertained. This is not only a great boon, but a great protection to the farmer, which cannot be overrated, when it is considered that about £1,500,000 are spent annually by the British farmer for artificial manure alone.

The annual exhibition of this society increase in interest and attraction every year; and, as a proof of the importance attached to them by other countries, it will be sufficient to notice, that they are generally attended by distinguished foreigners, and that of the last meeting at Lincoln were present, not only the Peruvian Minister, but a deputation from the Emperor of the French, for the purpose of obtaining information as to the best mode of forming a similar institution in France. While speaking of Lincolnshire, it may not be out of place to notice that that county furnishes the best and finest illustration of farming combining science with practice. It has been instanced by Mr. Pusey, in the Society's journal, as the best farmed county in the kingdom, and as having less waste than any other; and he assigns the secret of its success to the influence of the tenant-right principle, agriculture depending for advancement on the judicious outlay of capital, which can only be commanded with due security for its investment.

The prizes awarded for stock have also been the means of bringing before the notice of the agriculturists the best breeds of animals; and competitions has enabled them to ascertain for themselves where their own have been deficient in symmetry or quality, and what constitutes the best animals for the producer and the consumer. It affords them the opportunity also of seeing how far various breeds may be crossed to advantage, and how far they may be deteriorated for want of more attention and care in that respect. In furtherance of this, the Royal Agricultural Society has issued instructions to its judges that the prizes are to be awarded to those animals which, in their opinion, are the best adapted physically and symmetrically for the purposes of breeding.

The improvement in the construction of farm buildings, the promoting the discovery of new varieties of grain and other vegetables useful to man, or for the food of domestic animals, the measures for improving the veterinary art as applied to horses, cattle, sheep, and pigs, and the encouragement offered for the most skilful agricultural labourers, whether as shepherds, hedge-cutters, thatchers, &c., all within the province of, and promoted by agricultural societies, are means by which the agriculturists themselves are benefitted, and the successful result of their skill and enterprise promoted.

Nor must we pass unnoticed the great services which agricultural societies, and especially the Royal Agricultural Society of England, the Highland Society of Scotland, and the Royal Agricultural Improvement Society of Ireland, have rendered to the public in general, and to the agriculturists in particular, by the publication of statistics, essays, papers, &c. At the head of these publications stands, and most deservedly so, the Journal published by the Royal

Agricultural Society of England, and edited by that distinguished agriculturist, Philip Pusey, Esq. Without entering into lengthened details as to what it has done in this respect, it will be sufficient to state that a large amount is annually set apart by this Society for prizes for Reports and Essays, and the following list of the subjects and prizes for the present year will serve to show how wide is the field of its operations :—For a prize essay on the farming of Warwickshire, 50*l.*; and of Buckinghamshire, 50*l.*; chemical changes in the fermentation of dung, 30*l.*; artificial manures, and principles of their application, 20*l.*; artificial feeding-stuffs, 20*l.*; causes of fertility and barrenness in soils, 40*l.*; retention of moisture in dry turnip land, 10*l.*; prevention and cure of mildew in cereal crops, 20*l.*; lameness in sheep and lambs, 20*l.*; on other agricultural subjects, 10*l.*: total, 270*l.* While on this point it may be mentioned, in confirmation of the utility of these prizes, that the farming of Oxfordshire was one of the subjects for a prize last year, and that it was awarded to a member of the Oxford Farmers' Club, Mr. Read, late of Shirburn, for a composition which, for its masterly treatment of a wide and difficult subject, has never been excelled, and which is destined to be a guide and a handbook for all the agriculturists engaged in this district. This essay has been published in the Royal Agricultural Society's Journal, and also in the Oxford Journal.

With respect to Farmers' Clubs, they are subsidiary to, and have emanated chiefly from Agricultural Societies; and although the sphere of their operations is more limited, still they are eminently practical, and may be regarded as pioneers in the march of improvement. Having in view kindred objects with Agricultural Societies, the benefits which accrue from them are participated in by the public, and by the agriculturists themselves; but in a greater degree perhaps by the latter, inasmuch as the subjects which occupy their attention are mostly those which affect them as individuals, or as a class. In addition to this, the subjects discussed are chiefly of a local nature, and affecting perhaps a particular district, but at the same time the results collected may become applicable to other parts of the country placed under similar circumstances of aspect, soil, and situation.

In the same manner that local agricultural societies have benefitted by having for their guide and imitation the Royal Agricultural Society of England, so the farmers' clubs may be said to have been invigorated or brought into existence by that which is regarded the model farmers' club of England —the London Central Farmers' Club. So firmly rooted has this society become, so well is it supported, and so widely is its influence felt, that it has earned for itself the appellation of the "Bridge-street Parliament," on account of its having been the medium of making known the views and wishes of the agricultural body, not only on practical matters in connection with their avocation, but on those legislative measures which are calculated to affect their interests. This has been of immense importance to tenant farmers, because, although the landed interest is adequately represent in both houses of Parliament, the tenant farmers have long felt that there is almost a total absence of representatives of their particular interest, and the London Farmers' Club has in some measure made up for that deficiency.

The adjustment of the burdens on land, and imposts which fetter industry, tenant right, corn returns, &c., are subjects to which the London Farmers' Club has directed its attention, and, through its instrumentality, the wants and wishes of those engaged in the cultivation of the soil have been made known. Upon all practical subjects this club has been regarded as a great authority; for a question has seldom been discussed by it without eliciting the opinions and experience of many of the most distinguished agriculturists from all parts of the kingdom, to whom the society is rendered available. There is great reason to believe that the success of the London Farmers' Club, and the light which it has thrown on agricultural subjects generally, have done much towards creating and stimulating a desire for similar societies in the provinces. In all parts of England they are springing up; and the increasing number of their members is a proof that they are institutions in accordance with the taste of the agriculturists, and they may be regarded as evidences that that useful class of the community is most desirous of keeping pace with the advancement and requirements of the present day.

Owing in a great measure to the fact that the agriculturists are scattered over rural districts, they have few opportunities of interchange compared with other classes in towns, and this will account for that want of co-operation and union which is found prevailing among other sections of society. The meeting at market, and occasionally at an agricultural gathering, have, up to a recent period, been almost the only opportunities of their being brought together.

The altered state of things, which has thrown the agriculturists more on their own resources, and the fact that they have now to compete with the whole world, have led them to profit by the example of other classes, and to see the necessity and advantage of co-operating more with each other than they have hitherto done. To this circumstance may be mainly attributed the establishment and popularity of farmers' clubs, which are the means of bringing members together more frequently, not for social enjoyment, but for the purpose of discussing questions in which they are deeply interested, and of profiting by the experience and practice of others, and thus to confirm or confute the generally-received opinions. One striking feature in these clubs is this, that they employ a portion of their funds in the payment of professional and scientific lecturers, and by so doing the members are enabled to avail themselves of those advantages which science has conferred on agriculture, and to profit by the result of the researches, tests, and investigations of others, who have directed their attention to such subjects, and have made them their business and their study. Another laudable feature of these clubs is the encouraging their members, not only to take part in their discussions, and mutually to profit thereby, but to contribute by essays on given subjects, and thus to overcome obstacles or prejudices which present themselves in various departments of agriculture, and to set the minds of the members at rest on certain points on which they may have become perplexed. But perhaps, after all, one of the most useful purposes of farmers' clubs is bringing together landlords, tenants, and tradesmen, to one neutral field, where, in the mutual desire to promote the general good, and in a mutual combination for the same object, the asperities engendered by political feelings are smoothed down, and a more kindly feeling between all parties substituted. This has been one of the fruits of farmers' clubs; and a more striking illustration of this fact cannot be found than in this county, where landlords, tenants, and the tradesmen have united together for the purpose of carrying out an institution, novel in this locality, the great and primary object of which is to advance the science of agriculture in all its branches. Nor has the beneficial influence of such clubs been confined to the members themselves; for owing to the aid which they receive from the public press, their discussions and papers have been published in the local journals, and by such means information and enlightenment have been diffused throughout the various counties.

This has served to awaken a spirit of enquiry, to set men to think and to judge for themselves; while those who have been instrumental in founding and forming such societies have had the satisfaction not only of deriving pleasure and profit from them themselves, but of seeing others manifesting an interest in subjects to which they were before comparatively indifferent.

In a political (not partisan) as well as in a social point of view, farmers' clubs may be regarded as useful auxiliaries not only to agriculturists, but to the community generally, and without entering into the many and great questions to which they have directed their attention, it will suffice to notice three in particular—"The Tenant-right Question," "A better mode of taking the Corn Averages," and "A system of general Agricultural Statistics," which shall be not only a guide to the agriculturists themselves, but form a sounder and more correct basis for future legislation. There is reason to believe that these three great questions are, through the instrumentality of farmers' clubs, being brought more prominently before the public, and are progessing to a more satisfactory and equitable adjustment. This remark will apply more particularly to agricultural statistics, which, during the last ten or twelve years, has occupied the attention of every Government; and, whether the Board of Trade has been presided over by Lord Clarendon, Mr. Milner Gibson, Mr. Labouchere, Mr. Henley, or Mr. Cardwell, they have all recognised the immense advantage which would accrue from statistical returns of agricultural produce, which would give the result of different modes of operation, develop the capabilities of the soil to meet the requirements of the people, and account for that disparity in productiveness which now exists in various parts of the country.

On this question the farmers' clubs have made themselves heard, and with good effect; for in the miscellaneous estimates of last year the sum of £12,000 was voted for the collection of statistics in the three kingdoms. A complete system is now being carried out in Scotland, through the instrumentality of the Highland Society; in Ireland through the Board of Public Works; and in England in eleven counties—namely, Norfolk, Hampshire, Wilts, Suffolk, Leicester, Berks, Worcester, Salop, West Riding of York, Brecon, and Denbigh, under the superintendence of the local officers of the Poor Law.

It does not lie within the province of this Essay to enter into the merits of the question of agricultural statistics, but it may be mentioned, as a proof that it is not regarded as an inquisitorial measure, or prejudicial to the interests of the agriculturists themselves, that it is now universally adopted in Scotland, where it was first tried on a small scale, and that out of the 50,000 schedules issued to be filled up, only 100 have not been returned. Those statistics clearly show that the produce of Scotland is not only considerably lower than the estimates made by Mr. M'Culloch, but that the area of cultivated land is much lower than the quantities of Sir John Sinclair's estimate, prepared in 1814, under the sanction of the Board of Agriculture, which fact is sufficient to show the necessity and importance of more correct data from which deductions are to be drawn.

Farmers' clubs have another recommendation; namely, that they afford to their members the opportunity of discussing how far the burdens to which they are peculiarly subject, such as county rates, police rates, poor rates, and highway rates, may be more equalized, or made local, union, or national; and as legislation is rendered more perfect by being founded on facts and figures, societies which supply them render a service not only to its members, but to the community generally.

Such then are some of the benefits which have resulted to the public in general, and to the agriculturists in particular, from farmers' clubs and other agricultural societies; and, although it would be easy to extend the enumeration of them, this review of their operations, and the prospect which they hold out for the future, will serve to show their usefulness, and to constitute sufficient grounds for the support and co-operation of all who desire to see the science of agriculture, the great and paramount interest of this country, occupy that position among other sciences to which it is fairly and justly entitled. In the words of a great living statesman, "Neither our fleets, however well manned, nor our armies, however valorous, nor our diplomacy, however successful, can do so much as the plough and the draining tile to revive exhausted provinces, and recruit a failing population. Agriculture is truly a noble science, the most ancient and indispensable of all the pursuits that minister to the welfare and ensure the continuance of our race."

THE LORD BISHOP OF LONDON *v.* THE CITY SOLICITOR,

ON THE OBSERVANCE OF THE LORD'S DAY IN THE NEW CATTLE MARKET.

"A Correspondence between the Right Reverend the Lord Bishop of London and Charles Pearson, Esq., the City Solicitor, in regard to the due observance of the Lord's Day, in connexion with the proposal to change the cattle market-day from Monday to Tuesday," has just appeared in the shape of a pamphlet *dedicated* "*to all lovers of truth interested in the subject to which it relates.*" The correspondence is almost wholly written by the latter, and is rather a timely production—a skirmishing prelude to the opening of the new market, proving that the Corporation of London is right. For some time past, as our readers are aware, the trade at Christmas, the Islington Deputation, headed by the above right rev. prelate, and other parties at subsequent periods, have enabled the Markets' Improvement Committee with some degree of grace to postpone from time to time the opening of the new market, until the works are finished. These are now approaching to completion, and the pamphlet just tells those to whom it is dedicated that the Corporation will very shortly either open the new market or continue the old, with or without the consent of Her Majesty's Secretary of State, who is acting contrary to statute in refusing his concurrence to the bye-laws.

It appears from Mr. Pearson's first letter that he, in a most laudable manner, has laboured to secure the due observance of the Sabbath in the capital "for more than forty years;" and among other instances advocated for this purpose, in 1832, the change of the Monday market in Smithfield. On this point the Bishop of London accused him before Sir George Grey of having changed his opinions; while others of the deputation "indulged in some good-humoured raillery" at his expense relative to his "persuasive eloquence as City Solicitor" influencing Her Majesty's Secretary of State. From these charges he vindicates himself by shewing that the working of the new market in Copenhagen-fields, with railway and steam-boat conveyance, will be different from that of Smithfield at the above period; and after having disposed of this personal question he next opens the real one at issue, the change of market-days, thus:—

"I respectfully submit that your lordship ought not to ask, that the Secretary of State ought not to require, and that the Corporation ought not to consent to the change, for the following reasons :—

"Firstly—Because that by changing the market-day the desecration of the Sabbath would not be diminished.

"Secondly—Because by changing the day a serious injury would be inflicted upon a large body of industrious tradesmen.

"Thirdly—Because if the day were changed, small cattle markets, now held round London on other days, would be opened on the Monday to catch the custom of such butchers as could not attend on Tuesday. This would inflict an immediate injury upon the public, and might defeat all the objects contemplated by the legislature in establishing one great central metropolitan market.

"Fourthly—Because an attempt now to change the day upon religious grounds is *too late*. If successful, it would operate most injuriously and unjustly upon the Corporation; who, upon the faith of the existing law, have invested £400,000 in forming the largest and most perfect market in the world.

"Fifthly—Because an attempt to change the day on religious grounds is at this time *premature*, and involves a most disrespectful and underhand interference with the independent action of the governing authorities of the City."

Proof is advanced in support of these several propositions at some length, of which the following is the substance :—

First.—That arrangements have been made so that nineteen-twentieths of the cattle and sheep offered for sale be delivered by railway within the enclosure of the new market between Friday and very early on Sunday morning, or practically speaking on Saturday; and that the one-twentieth remaining (drove cattle) can be prohibited from travelling the streets on Sunday by the bye-laws. And "that there will be no necessity for any attendance on the Sunday, except to fodder the stock." That the Markets Committee heard evidence to the contrary from both clergymen and the trade, and the result was that the evidence thus adduced proved that the specious idea of bringing up cattle to the capital on Monday for the proposed Tuesday market was impracticable, owing to the heavy traffic and excursion trains on that day; that all practical men were unanimous that fat stock required a day's rest after their long journey to the capital before standing in the market and driving to their final destination; and that the change would therefore not only transfer the extra labour of Saturday to Sunday, but also increase the amount of Sunday excursions by the inhabitants of the capital, who at present take Monday as a holiday for this purpose—thus increasing the desecration of the Sabbath to a fearful extent.

Secondly.—That the meat-consuming inhabitants of the capital have a hot joint on Sunday and a cold one on Monday; that they require a fresh supply on Tuesday; that Monday is consequently peculiarly adapted as a market-day for butchers, while Tuesday is the reverse; and that they would therefore suffer by the change.

Thirdly.—"That markets are grown, not created." That Southall, Romford, and Croydon would grow beautifully large, while the new market would grow beautifully less! and that the Bishop of London "is too well versed in the science of political economy not to perceive the serious injuries that would result to the public from such a change." And, finally, that Smithfield market must be removed "*bodily*" with all its antiquated machinery!

On this head Mr. Pearson is rather unfortunate, and we fear will have some difficulty in getting either the Prelate or inhabitants of Southall, Romford, Kingston, and Croydon to subscribe to his proposition, much less farmers and the inhabitants of the capital generally to his proof. Instead of sellers receiving "a fair and steady average price" for the stock in Smithfield, as assumed, and as too often and too confidently cuckooed by salesmen and the trade, *the reverse is true*. During the last few weeks, for instance, our ears have been dunned by farmers relative to the sacrifice made by sending stock to Smithfield. The fact that a large proportion of all the stock sold there is bought by jobbers, and sold again to butchers, proves this. And what, we may ask, is it but this which is increasing the carcase trade at such a rate? Very few farmers, the Corporation may rest assured, will send their stock to the above markets, save those in the immediate neighbourhood, unless they get a higher price; and if the new market in Copenhagen-fields is the cheapest, we may safely aver the butchers of the capital will attend it. Were the Monday market-day changed, butchers would, as they now do, apply to Newgate for short-comings; purchase stock on Monday destined for the Tuesday market; and on Tuesday afternoon, when they could not attend in the morning. The consequence of which would be, a further reduction of price; so that farmers, instead of sending either to the metropolitan or its suburban markets, would slaughter and consign to Newgate. This, we venture to say, is the conviction of every intelligent farmer, salesman, and butcher in the kingdom.

Fourthly.—The argument under this head is conclusive: that the Corporation have undertaken the management of the market upon the faith that they, as Commissioners, had alone the power to fix the market-days, and that, on the contrary, had Parliament intrusted the Secretary of State with such a power they would not have invested their capital. These are undeniable facts; and we are only sorry that Sir George Grey and his predecessor should ever have allowed themselves to become subservient to other purposes than those contemplated by the statute.

Under the religious view of this head, the Right Reverend the Lord Bishop of London and deputation are so honestly dealt with, that we quote two entire paragraphs we could hardly with justice abridge.

"But, my lord, I venture to contend, that if the dictates of conscience and the cause of religion did render it necessary that the gentlemen acting under your lordship's auspices should now associate together for the purpose of enforcing this change of days, it was equally necessary for them to do so before the bill under which the cattle market is to be established was passed into law."

"If, my lord, there were really any necessity for the change of day upon the high religious ground which is now assumed, I am sure that circumstance would not have escaped your lordship's observation while the Bill was passing through its various stages in the House of Lords. I have refreshed my memory upon this point by referring to Hansard, and I find that upon none of the several occasions when the Bill was before the

House did your lordship breathe a single hint upon the subject."

So far as the change of market days is involved, this, we repeat, is to the point; but otherwise the proposition is liable to objection. Experience, for instance, has yet to decide whether the enormous sum stated has been properly invested, either for the pecuniary interest of the trade or the religion of the district. On this point we should have no difficulty in proving the contrary; for the construction of the market and lairs, and the existing commercial machinery of Smithfield, which the Corporation have so studiously endeavoured to preserve, are not only antiquated and out of date, but calculated also to preserve the desecration of the Sabbath as at present. Unacquainted with the progress of science in the management of fat stock, the Lord Bishop of London and the Islington Deputation may, while the Bill was before the Lords, have intrusted too much to the Corporation relative to the construction of the market, and afterwards have adopted the wrong means to obtain the end sought, as they doubtless have; but these mistakes on their part do not justify the Corporation, much less free them from the sentence which may await them of standing condemned at the bar of Experience for erecting a cattle market on an erroneous principle, incompatible with the management of fat stock in modern times.

Fifthly. The Legislature not having changed the market day, on religious grounds, the proposition of change between the passing of the statute and its being carried into execution is obviously *too soon*, since nothing has transpired to make it more necessary now than when the question was before Parliament. The Corporation whom the Legislature empowered to fix the market days promise they will make whatever changes religious or other circumstances may require. What more can be desired of them as Market Commissioners?

In his summary of these five propositions, Mr. Pearson says to the effect that the Corporation have performed their part of the *contract*, and now look to Government for the fulfilment of theirs, and concludes by assuring the Right Reverend Prelate that the Corporation would refuse to change the market day should Sir George Grey insist for it, and that the consequence would be the continuance of Smithfield Market until Parliament settled the question.

To this letter the Bishop returns a very short but courteous reply, giving the Corporation and their solicitor credit for good intentions, but declining to subscribe to their actions, or withdraw his signature from the memorial laid before the Secretary of State.

The second letter of Mr. Pearson is less successful than the first, while the memorial of 105 salesmen which accompanies it is still more liable to objection. The only additional circumstances advanced are — *first*, that four-fifths of the salesmen subscribe a memorial in his favour; and *second*, that the Attorney-General concurs in the possibility of stopping the travelling of cattle in the streets on Sunday. But, unfortunately, the only additional argument advanced by the memorial—that the "arrangements of country fairs and markets, that in the course of so many years have adapted themselves to the Monday's market, would be entirely unhinged by the change" of market days—is erroneous, for railway and steam-boat conveyance have altered circumstances here; and, where new markets have arisen in the provinces, these could easily be changed. In point of fact, the commerce of fat stock in the provinces is now undergoing a sort of revolution, and not before it is time. When practical men have recourse to arguments of this kind, it only creates suspicion that unseen circumstances exist which ought to be revealed—such as their interest in private lairs, the character of the new market lairs, and the prosperity of the carcass trade, which is fast superseding the live stock.

These are facts which neither the deputation nor the public can overlook, in the discharge of their respective duties. Do the committee of salesmen, for example, admit that the new lairs in Copenhagen-fields are better than their own, and that they will therefore use them? and that, consequently, all travelling in the streets until the cattle pass into the hands of butchers, or until Monday morning, will thus be put a stop to? This is the practical way of putting a stop to Sunday labour; and why not adopt it?

If suitable lairage, in terms of the statute, is provided, then stock should be placed in them on Saturday night; and there be examined by salesmen, to see that all is right and ready for sale on Monday. In this case there can be no doubt where the interest of farmers, butchers, and the public lies. Has that interest been duly consulted? Practically important as this question is, and coincident with the interest of the Corporation, strange to say, it appears to be studiously or unwittingly shunned. When so large a portion of the stock on sale are bought to be sold again in Newgate, it is not surprising that cattle salesmen should talk of "petty markets" and "irregularity in returns," taking care not so much as to mention the carcase trade. But why does the City Solicitor, with all his "persuasive eloquence" in "this little pamphlet," dedicated "to all lovers of truth," also overlook the universally admitted fact that the carcase trade is destined at no distant date to supersede the new live stock market, with all the petty markets of suburban towns referred to in the second proposition? Is it a got-up production to "whitewash" the Corporation in the eyes of the trade, who feel rather sorely on the treatment they have received at Christmas and subsequently? It is certainly a document which can have little influence either with Sir George Grey or the Bishop of London and Islington Deputation, both of whom are long ago familiar with the only arguments of weight which it contains, from the columns of the *Mark Lane Express*.

With regard to the opinion of the Attorney-General, relative to stopping Sunday travelling of cattle in the streets, that can only be on the condition that suitable lairage is provided within the inclosure of the new market. If, for example, the above 105 salesmen sign a memorial to the effect that they approve of the new lairs, and intend to use them, then a bye-law prohibiting Sunday travelling may be made. But, unfortunately, the pamphlet before us contains no such memorial, or "breathes a hint" that such has ever existed; and, therefore, the opinion of the Attorney-General falls to the ground until Experience turns his verdict in favour of the new lairs. Opinions, in the absence of experiment, go for nothing, in practical questions of this kind; for although we are aware that the construction of these lairs is antiquated and irreconcilable with the progress of modern science, yet that of private lairs may be as bad; consequently experiment has to decide which is the least of two evils. Now such being the facts of the case, it follows that such a bye-law cannot prudently be framed before the opening of the market. We should be unpardonably overlooking the interests of the readers of the *Mark Lane Express* were we to allow their fat stock to be caught in such a clap-trap monopoly as such a bye-law might render the lairs of the new market. We must have free trade in lairage before we can expect progress in the management of fat stock in the capital, and therefore hope that neither her Majesty's Attorney-General, and Secretary of State, nor the Right Reverend the Lord Bishop of London, and Islington Committee, will lend their sanction, directly or indirectly, to the contrary.

CLASSIFICATION AND EXTIRPATION OF WEEDS.

BY J. D.

A weed is any plant that is useless for, or noxious to a certain intended purpose in the production of vegetables. It has no definite application to any particular plant or species of plants; but whatever plants grow among corn, grass, or on roads and in hedges, and which are either of no use to man or injurious to crops, are denominated "weeds;" and every plant which grows in a field other than that of which the seed has been sown by the husbandman, and inasmuch as it interferes with the intended crop, should be carefully eradicated. Farming is that nothing grows on land except what is sown; and though this object may not be attainable, as there ever may be a wide difference between possible and ideal excellence, yet the nearer we approach to it, the nearer we approach to perfection; and if it be absurd to expect perfection in any art or performance, there can be neither foolishness nor absurdity in making the nearest possible approaches to it.

Though the plants of Nature which are called "weeds" are both useless and injurious to the purpose of the farmer, we must not suppose that on that account they have been created in vain, or that Nature has used its efforts in producing useless objects. The mind that is capable of beholding the creation in a comprehensive and condensed focus, will arrive at a very different conclusion, and will not believe that any productions are useless, even those for which the discoveries of man have not yet found any application. It must not be imagined that the stores of Nature are exhausted, and far less that the limited powers of man are able fully to investigate and explain the nature and use of the different objects that catch his eye and engage his attention. Past and present experience has shown that the medicinal uses of plants are very great; and from them are obtained the drugs that tend most powerfully to check and remove the disorders of the human frame. This one property very sufficiently vindicates their claim to a high place of utility, and rescues them from a useless degradation. When the vegetation has reached the maturity of full blossom, the structure forms a body of ligneous and vascular matter, which, being used in decomposition, forms the very best manure that is yet known; for of all the ingredients that accessory science is daily bringing into use for the purpose of fertilizing the earth and stimulating the growth of plants, no competitor has yet appeared that is capable of contesting the foremost place which decaying vegetable matters have held in the scale of manures ever since the art of agriculture was practised by man. These two invaluable properties being duly considered will convince that when any production of Nature is found to be useless for some specific purpose, or hurtful to any object that is desired to be attained, the conclusion must not be drawn that it is on that account to be reckoned some careless or superfluous item thrown heedlessly from the lap of Nature's bounty, and about which it has not exercised the provisionary and fitting aptitude that is so abundantly displayed in the stupendous magnificence and minute care that pervade every fabrication of Nature's workshop. Nothing more powerfully tends to elevate the mind of man than the contemplation of the works of Nature, and profound and serious thoughts are very agreeably relieved by passing from the grand to the minute, there to admire with equal adoration the plastic hand that paints the crocus and the lilac, and which has essayed its art in heaving pile upon pile to form mountains almost to scale the vault of heaven. It is most pleasing and instructive to a contemplative mind to observe and follow the graduated scale of natural objects that daily and hourly occur for observation and reflection, beginning with the lowly plants on which he treads, and which he may think are useless, and following the upward course of Nature till he arrives at the utmost bounds of comprehension, and finally loses himself in immensity. Such a course of observation and reflection is most necessary in order to draw just conclusions about the works of Nature, to raise the ideas above a mole-eyed plodding in the world's mud, and the clay-born sympathies and cold contemplations that are engendered by the mind being chained to the earth it inhabits.

The word "weed" must, therefore, be understood as a plant that is useless for a certain purpose, and for which a better agent has been found; and as being hurtful to another plant, which has been found to be the most valuable yet known to yield the purpose that is desired; and that these plants are only useless and hurtful in the light in which we view them, or for the purposes of agriculture.

The tillage part of agriculture is formed entirely of a continual warfare between the cultivator and the weeds that grow on the land; and as in farming nothing should grow except what is sown, the efficiency of cultivation is judged by the presence or absence of the useless growths that appear on the ground; and as the removal of all useless vegetation is the main object of arable culture, a knowledge of the nature of the plants that are included under the name of "weeds" may prove useful when accompanied with a description of the easiest and most approved modes of eradication.

Weeds being many in number, some division or classification becomes necessary, in order to elucidate and simplify the subject and relieve the memory. Classification must be simple, concise, and comprehensive, being designed to produce order from confusion; if it be crowded with divisions and details, it is nothing better than the original mass, and burdens but does not relieve. Simplicity presents an object that is easily seen and retained in view, conciseness reduces the object to the fewest possible parts, and comprehension unites all the necessary adjuncts into one assemblage. Keeping these rules in use, weeds are most conveniently classified in two divisions: 1, Annual; and 2, Perennial. Annual plants are such as die after perfecting the seeds in the first year. They produce seeds very abundantly, and on light soils give much trouble.

Some few weeds are biennial, or perish in the second year after perfecting the seeds. They are abundant in the production of seeds as well as of plants, and are destroyed with greater difficulty than the former division. Not to enlarge the classification, these plants are included in the annual section, and the distinctions mentioned as the plants are treated.

Perennial plants are such as exist for an indefinite period of time. Some have the property of perfecting the seeds annually, without being thereby destroyed; others, less prolific in seeds, have the faculty of reproduction in their vivacious roots; while several plants are capable of increase both by seeds and roots. The plants of this description are much more troublesome and difficult of destruction than the two former divisions.

Weeds have been placed in many divisions: as weeds which infest tillage lands, which grow on pasture grounds, which are found on wastes, roadsides, hedge roots, and ditch banks, which infest samples of corn; fallow weeds, rampant weeds, and weeds which never rise into the sickle. These distinctions are vague and indefinite, as circumstances of soil and situation will destroy the characters that are given. The proper distinctions must be strictly permanent, and independent of any attachments. When the character is liable to be changed, the division is useless and order is lost. The single character of annual and perennial is persistent in all cases, being a natural ordination and never subverted. That foundation being preserved, all the other attendant qualities that have been used as the grounds of classification will be mentioned under the head of each plant, and thus ensure all the necessary description without the encumbrance of so many heads and divisions.

In the following descriptions of plants, the scientific character is given in order to suit the readers that are versed in botany; the natural properties are related to please the observer, who may not be learned in science, but is curious in remarks; while the physical appearances and attendant qualities, with the means of extirpation, are exhibited for the use of the practical cultivator, who only seeks to destroy what impedes his purpose, without any further inquiry or entertainment of the subject.

There is an absolute necessity for the introduction of the botanical descriptions, as a standard of general reference, by which every description must be arranged and all distinctions settled. Without a fixed standard no understanding could be made, or is in any way to be attained. The provincial names of plants are only understood in the locality, and are wholly useless beyond the confines of the district. To other countries the language is wholly unintelligible, and a general reference must be adopted. That it may be little known or not known at all to many readers is no fault of the system, but of the negligence that has not reached its elevation. In like manner the Greek and Latin languages have been adopted for scientific purposes; because, being very generally studied, the standard of reference becomes known to the learned of all nations.

As it is essential to natural history that the nomenclature be universal, so it is indispensable that the names be written in some language that is universally accessible and understood by all persons and countries.

SECTION I.—*Annual Weeds.*

1. COMMON CHICKWEED (or "Stellaria media" of botany) is a very common weed on light soft loams that have been abundantly manured. This genus of plants has been called "Stellaria" from the star-like form of the flowers. It formed the "Alsine" of the older botany, and so called because the plant grows best in woods and shady places. Withering referred it to the "Stellaria," with which genus it agrees in several respects, and especially in the capsules opening with six valves. The British Flora also refers it to the genus "Stellaria," and characterizes it under the name of "media." The genus "Stellaria" belongs to the class and order "Decandria trigynia" of Linnæus, and to the na-

tural order "Caryophylleæ" of Jussieu. Generic character: Calyx, perianth five-leaved; leaflets ovate-lanceolate, concave, acute, spreading, permanent; corolla, petals five, two-parted, flat, oblong, shrivelling; stamina, filaments ten, filiform, shorter than the corolla, alternately longer and shorter, anthers roundish; pistil, germs roundish; styles three, capillary, spreading; stigmas obtuse; pericarp, capsule, ovate, covered, one-celled, six-valved; seeds, very many, roundish, compressed. Essential character: Calyx, five-leaved, spreading; petals, five, two-parted; capsule, superior, one-celled, many-seeded; six-toothed at top.

The species of common chickweed assumes very different appearances in different soils and situations. It thrives in all soils, from the damp and boggy woods to the driest gravel walk in gardens, and is often seen with leaves nearly two inches long and more than an inch broad, and the height sometimes exceeding half-a-yard. The number of stamens is uncertain: in damp situations, with a northern aspect, they amount to ten; and in drier soils and in more sunny exposures, the number is usually three to five. The leaves are ovated, and the stalks procumbent, having the lateral line alternately hairy. When the flowers first open, the peduncles are upright: as the flowers go off, they hang down; and when the seeds ripen they again become upright. The flowers open from nine in the morning till noon, but are shut during rain. They are pendent after rain, but in the course of a few days rise again. At night the leaves approach in pairs, so as to enclose between their upper surfaces the tender buds; and the two upper leaves but one at the end of the stalk are furnished with longer petioles than the others, so that they can close upon the terminating pair and protect the end of the branch. This is always mentioned as a very remarkable instance of the sleep of plants.

The "Stellaria media" is distinguished from the "Cerastiums" by the number of pistils, and by having the petals shorter than the leaves of the calyx; and particularly from the "Stellaria nemorum" by having the stalk alternately hairy on one side only. The young shoots and leaves when boiled can scarcely be distinguished from spring spinach, and are equally wholesome. Swine are very fond of it, cows and horses eat it, sheep are careless of it, and goats refuse it. It is a very grateful food to small birds and young chickens. and it is eaten by many insects. As a medicine it was formerly used very extensively; but the application of it is now reduced to swellings, either alone or in poultices. The medicinal virtues are acknowledged; but the active matter is small in comparison with the grosser parts, and is very divided and diluted in the herb.

The common chickweed is an annual plant, and flowers almost throughout the whole year. In gardens, or dung-hills, and on soft, light, loamy lands that have been abundantly manured, it grows luxuriantly and sheds a profusion of seeds, which are round, compressed, yellow, and rough, with little tubercles, and thus becomes a troublesome weed. On soils that suit its temper, it is uncommonly tenacious of life; and if the weather be damp and showery, the roots immediately adhere to the soil and the plant grows afresh, after being removed by the hoe and the scuffler. The great object is to prevent its perfecting any seed; but, as it grows nearly the whole year, the difficulty is almost insuperable. It is very hurtful to young turnips, clovers, carrots, and all slow-growing plants. A close crop of vetches smothers it very readily. The most effectual way of clearing light lands from such a very troublesome weed, is to gather the plants during dry weather, after being well shaken by the hand, and cleared from the adhering earth. The plant is naturally juicy and succulent, and upon being laid into a heap, it quickly ferments and decomposes into an earthy mass. Cool earths may afterwards be added, as loam and effete lime, and a very good compost will thus be obtained. When the plant is pulled up by the hoe in order to be removed, it should be full grown, but before the seeds are formed.

2. THE CORN SPURREY,

Or "Spergula arvensis" of botany, is a plant of much notoriety, both as a weed and in cultivation. The plant belongs to the class and order "Decandria pentagynia" of Linnæus, and the natural order "Caryophylleæ" of Jussieu.

Generic character: Calyx—perianth inferior, of fine ovate, obtuse, concave, spreading, permanent leaves. Corolla — petals five, ovate, concave, spreading, undivided, larger than the calyx. Stamina—filaments ten, rarely but five, awl-shaped, shorter than the corolla, anthers roundish. Pistil —germen superior, ovate; styles five, somewhat reflexed, thread-shaped; stigmas thickish. Pericarp—capsule ovate, covered partly by the calyx, of one cell and five valves. Seeds numerous, globose, but depressed, surrounded with more or less of a notched or dilated border.

Essential generic character: Calyx of five leaves; petals five, undivided. Capsule superior, ovate, of one cell with five valves.

This genus differs from the "Cerastium" in having undivided petals. Their general habit also differs more than is the case with most genera of that natural order, that of "Spergula" nearly according with various "Arenaricæ," from which the five styles only distinguish it. The smooth-seeded Spurrey has but five stamens.

The rough-seeded Corn Spurrey, the plant now mentioned, is the most common species in Britain. Leaves in whorls, forming two bundles, about eight in each; stalks of the fruit reflexed. Root annual, small, fibrous. Herb more or less downy and viscid, very various in luxuriance, somewhat succulent and brittle, with a branched, round, loosely-spreading stem, a foot in length, swelling globular, whose joints are beset with copious, whorled, linear, obtuse leaves. Panicles many-flowered, terminal, forked, divaricated, level-topped. Flower-stalks downy, strongly reflexed from the base as the fruit ripens. Stipules in pairs at the joints. Calyx membranous at the edge, nearly as long as the white petals. Stamens generally ten, sometimes five, or some intermediate number. Capsule almost twice as long as the calyx. Seeds numerous, kidney-shaped or roundish, swelling, angular, with an obsolete, not dilated, nor membranous border; when ripe they are black, and rough all over with minute tubercles or bristles. Poultry are fed with the seeds, and the herb serves as fodder over the continent of Europe.

Spurrey is a very troublesome weed on a light soil. It flowers from July to September. The bulk is not great, nor the growth luxuriant; yet it is quick, and very tenacious of life, and produces seeds in a very plentiful manner. In northern, damp climates, whole fields of moorish, light soils are so much infested with it, that the crops of all kinds are often wholly destroyed. In such cases of an abundance of the plant, the gathering it off by hand-shaking is the most effectual mode of relieving the land from such a pest.

A larger variety of the Corn Spurrey is cultivated as excellent food for milch cows.

3. SPEEDWELL,

In the ivy-leaved species, is a weed of importance on soft loams, and on land capable of producing both wheat and green crops. The plant is the "Veronica hederifolia" of botany; the genus Veronica, which belongs to the class and order "Diandria monogynia" of Linnæus, and the natural order "Pediculares" of Jussieu.

Generic character: Calyx—perianth inferior, of one leaf, in four (rarely five) deep, lanceolate, acute, sometimes obovate, permanent segments. Corolla of one petal, wheel-shaped; tube almost as long as the calyx; limb flat, in four deep, ovate, unequal segments, the lowermost narrowest, the opposite one broadest. Stamens—filaments two, inserted into the tube of the corolla, spreading, ascending, tapering downwards; anthers roundish, oblong. Pistil—germen superior, compressed; style thread-shaped, the length of the stamens, declining; stigma simple, obtuse. Pericarp—capsule inversely heart-shaped, or somewhat elliptical, compressed in the upper part, of two cells, and two more or less cloven valves. Seeds numerous, roundish.

Essential character: Corolla four-cleft, wheel-shaped, the lower segment narrowest. Capsule superior, of two cells.

The "Speedwell" is a very natural genus, and an extensive one, comprehending eighty-five species, which are commodiously and naturally arranged by their inflorescence.

The ivy-leaved Speedwell, which is now mentioned as a weed, has the flowers solitary. Leaves heart-shaped, flat and five-lobed. Segments of the calyx heart-shaped, acute. Seeds cupped, wrinkled. Root annual, small, fibrous. Flowers pale blue, on long solitary, axillary foot-stalks. It is sometimes called "Small Hen-bit," and in Norfolk the name is "Winter-weed."

This plant flowers in April and May, and seldom later. It is a native of Europe and Barbary, and grows in gardens, fields, and waste grounds. The presence of it is not very troublesome, and it yields readily to cultivation by the hand-hoe and the scuffler.

4. CROWSFOOT

Is a weed very common on clay lands which have an upper soil of a soft damp nature. The plant belongs to the class and order "Polyandria Polygynia" of Linnæus, and the natural order "Ranunculaceæ" of Jussieu.

Generic character: Calyx perianth, of five ovate, concave, somewhat coloured, deciduous leaves. Corolla—petals five, obtuse, polished, with small clawed nectary, a cavity in each petal, just above the claw. Stamina—filaments very numerous, half the length of the corolla; anthers firmly united therewith, erect, oblong obtuse, of two separate lobes. Pistil—germens numerous, collected into one head; styles, none; stigmas reflexed, very small; pericarp, none. Receptacle beset with extremely minute stalks, to which the seeds are attached. Seeds numerous, naked, irregular, uncertain in figure, with a reflexed point.

Essential character: Calyx, five-leaved. Petals, five to eight, with a honey-bearing pore in the claw of each. Seeds naked.

The most essential mark of this genus is the nectary, the rest of the parts being uncertain. The nectary is, in some species, a naked pore; in some it is bordered with a cylindrical margin; in others, closed with a notched scale.

The "corn crowsfoot," or "Ranunculus arvensis" of botany, has the root annual and fibrous. Stem one or two feet high, much branched, many-flowered, leafy, nearly smooth. Leaves of a light green colour, slightly hairy, stalked, once or twice ternate, as well as deeply three-cleft, the ultimate segments almost linear, entire, or rarely notched. Flowers small, lemon-coloured, stalked, lateral and terminal. Calyx spreading, hairy. Petals obovate, veined. Fruit, depressed. Seeds very large, compressed, with erect awl-shaped hooked beaks, their sides armed with numerous prominent awl-shaped prickles, largest towards the margin.

The genus "Ranunculus" is very extensive, reaching to eighty-five species, of which fifteen are natives of Britain. The species are all herbaceous, generally of an acrid quality. The prevailing colour of the flower is yellow. They grow in cold, temperate climates, and some of the plants are Alpine. The whole genus is very conveniently divided into two sections, by the form of the leaves.

The species now noticed as a weed is one of the most virulent of its genus, especially when young—causing inflammations and gangrene in the stomachs of sheep and oxen, although it is eaten by them with great avidity. The expressed juice of the plant is also fatal.

The crowsfoot produces seeds in great abundance; and the corn species being an annual plant, Nature has furnished it with the prolific seed-bearing quality which attaches to the plants of that period of duration, in order to compensate for the short existence of the stem. No process of summer fallowing the land can kill the numerous seeds; and as the soils on which it grows are not suitable for drilled green crops, there becomes a necessity that the wheat crop be drilled, in order to give an opportunity of pulling the plants by hand at the time when they are in full bloom, and when no seed has been formed. It is frequently called "Hunger-weed," probably from its growing on the poorer soils.

5. THE CORN COCKLE,

Or "Agrostemma" of botany, is a common weed in corn fields, mostly on clayey loams, or the more loamy wheat fallows. It belongs to the class and order "Decandria pentagynia" of Linnæus, and to the natural order "Caryophylleæ" of Jussieu.

Generic character:—Calyx—perianth, one-leaved, coriaceous, tubulous, five-toothed, permanent. Corolla—petals five, claws the length of the tube of the calyx, border spreading obtuse. Stamina—filaments awl-shaped, five alternately later than the other five, inserted into each claw of the petal; anthers simple. Pistil—germ ovate; styles—filiform, erect, the length of the stamens; stigmas simple. Pericarp—capsule oblong, ovate, covered, one-celled, five-valved. Seeds—very many, kidney-shaped, dotted; receptacles three, as many as seeds, the interior ones gradually longer.

Essential character: Calyx one-leaved, coriaceous. Petals five, clawed border, obtuse, undivided. Capsule one-celled.

There are four species, of which the "Agrostemma githago," or corn cockle, or campion, is the common British plant. It is hirsute or hairy, with calyx longer than the corolla, petals entire or slightly emarginate, and naked. The plant is a common annual weed in corn fields, flowers in June and July, and has a very beautiful appearance. The seeds are black, with a surface like shagreen, and appear in the microscope like a hedgehog rolled up. The seeds are ripe about the time of harvest, and, from the size, cannot be easily separated from the corn in sifting; the farina is oily, and when ground with the corn it greatly deteriorates the flour. Along with very complete fallowing of the land, the only mode of extirpation is by hand-weeding and by drilling the grain crops for that purpose. The plant rises to height early in the season, and affords an opportunity of pulling the stems by hand, before the wheat grows to exclude any access to the ground.

6. THE POPPY,

Or "Papaver" of botany, infests some soils as a weed, in the corn species of the plant, or the "Papaver rhœas," the common red poppy or corn rose. The poppy belongs to the class and order "Polyandria monogynia" of Linnæus, and the natural order "Papaveraceæ" of Jussieu.

Generic character: Calyx—perianth inferior, ovate, emarginate, of two nearly ovate, concave, obtuse, immediately deciduous leaves. Corolla—petals four, roundish, flattish, spreading, large, contracted at the base, alternately smaller. Stamina—filaments numerous, capillary, inserted into the receptacle, much shorter than the corolla; anthers oblong, compressed, erect, obtuse. Pistil—germen superior, sessile, large, roundish; style none; stigma depressed, peltate, flat, radiated. Pericarp—capsule oval, or somewhat oblong, crowned with the large, flat, permanent stigma of one cell, though imperfectly divided into many, bursting at the top by numerous orifices under the stigma. Seeds, numerous, minute; receptacles, longitudinal folds attached to the inside of the capsule, equal in number to the rays of the stigma.

Essential character: Calyx of two leaves, petals four, stigma radiated. Capsule superior, of one cell, opening by the pores under the permanent stigma.

There are two divisions of the poppy plant—with the capsules bristly, and smooth. The corn poppy belongs to the second section. The capsules are smooth, nearly globular. The root is annual. Stem about two feet high, branched, clothed all over with bristly hairs, that all spread horizontally. Leaves pinnatifid, often in some degree bi-pinnatifid; their segments oblong, serrated, and cut;

more or less hairy. Flowers slightly fetid, and of a deep and most brilliant scarlet-red colour. Capsule quite smooth and even, short and abrupt, with a many-rayed stigma.

The poppy flowers in June and July, and perfect a large proportion of seeds. It delights to grow on waste grounds, and on badly-managed cultivated fields. Good tillage soon destroys it. Clover and tares, which are cut while the poppy is in flower, generally eradicate it. It will increase rapidly if the seeds be allowed to ripen. In some seasons the plant appears in great abundance, and in others not a plant will be seen.

The heads or capsules of this plant are yet retained in use as an opiate; especially a red syrup is made of the flowers, which serves as a mild soporific for children.

7. WILD MUSTARD

Is an annual weed, of much annoyance on some of the best soils. It is the "Sinapis" of botany, which belongs to the class and order "Tetradynamia siliquosa" of Linnæus, and the natural order "Cruciferæ" of Jussieu.

Generic character: Calyx — perianth inferior, spreading divided into four linear, concave, channelled leaves, forming a cross; deciduous. Corolla cruciform, of four rounded, flat, spreading, undivided petals, with erect linear claws, scarcely the length of the calyx. Nectary composed of four ovate glands, one on each side between the shorter stamen and the pistil, and one each side between the longer stamen and the calyx. Stamina — filaments six, awl-shaped, erect, the two shorter ones opposite; anthers erect, spreading, pointed. Pistil — germen superior, cylindrical; style, the length of the germen and height of the stamens; stigma capitate, undivided. Pericarp—pod oblong, inflated unequally at the lower part, rough, of two cells and two valves, partition generally twice as long as the valves, large, compressed. Seeds numerous, globular.

Essential character: Calyx, widely spreading; claws of the petals straight; nectariferous glands, four; pod more or less cylindrical; the partition longer than the valves.

The "Sinapis," or wild mustard, differs chiefly from the "Brassica," or turnip plant, in having a spreading calyx, and the claws of the petals erect.

The "Sinapis arvensis," or the wild mustard of the fields, has the root annual, fusiform; a stem from nine inches to a foot and a-half in height, upright, rough, with a few stiff hairs or bristles, bent somewhat downwards. Branches spreading. Leaves petioled, rugged, serrate; sometimes entire, but most frequently jagged at the base, and sometimes lyrate or pinnatifid. Flowers at the end of the stem and branches in a clustered corymb, each on a pedicle the length of the calyx, and slightly hispid; corolla always yellow. Siliques spreading, slightly hairy, or sometimes smooth, torose or swelling, ending in a short, compressed, ensiform, grooved beak. Seeds, dark-brown, shining, eight or nine; extremely pungent, and well known under the name of "Durham mustard." It flowers in June and July, but occasionally in all open weather, and forms a very troublesome weed on heavy moist corn lands. The seeds are of an oily nature, and remain dormant in the soil for an indefinite time if buried below the depth of six inches. On being brought by deep ploughing near to the light of day, the plants appear in such abundance as to overrun and smother any growing crop. They may be destroyed before seeding, and winter tares being cut when the flower is in blossom will much help to destroy it; and if a crop of turnips follows the tares, the charlock will be well nigh destroyed. The crops being drilled, the blossomed plants must be pulled by hand, and carried from the field; for the seeds, if only half perfected, will grow with much readiness.

The classical name in English is "wild mustard;" but it is variously called, in provincial language, charlock, garlock, warlock, chadlock, cadlock, and kedlock. The young plants, and particularly the tender tops before they flower, are boiled, and eaten as greens by the peasants in Scandinavia, Ireland, and many parts of England.

8. GROMWELL,

Or, the "Lithospermum" of botany, is a plant of frequent growth on soft lands on a clayey bottom, mostly adapted for wheat. The plant belongs to the class and order "Pentandria monogynia" of Linnæus, and the natural order "Borragineæ" of Jussieu.

Generic character: Calyx—perianth five-parted, oblong, straight, sharp, permanent; divisions awl-shaped, keeled. Corolla—one-petalled, funnel-form, length of the calyx. Tube, cylindric; border, half-five-cleft, obtuse, upright; throat, perforated, naked. Stamina — filaments five, very short; anthers oblong, incumbent, covered. Pistil —germs four; style filiform, length of the stamens; stigma obtuse, emarginate. Pericarp none. Calyx grown larger upright, containing the seeds in its bosom. Seeds four, rather oblong, obtuse, gibbous.

Essential character : Calyx fine-parted. Corolla funnel-form, perforated at the throat, naked.

The "Corn Gromwell," "Bastard Alkanet," or the " Lithospermum arvense", has the seed ovate, wrinkled. Calycine leaflets, lanceolate. Corollas scarcely longer than the calyx. Leaves lanceolate, sharpish, hispid. Root annual, small, and not much branched. The bark abounds with a deep red dye, which stains paper and linen. Stem upright, a foot or more in height, round or slightly angular, rough, with close-pressed hairs, often much branched at the top. Leaves alternate, lanceolate, entire, rigid, sessile, rough, with bristly hairs close-pressed standing out from the edge. Flowers solitary, nearly sessile in the axils of the upper leaves. Corolla small and white, with five swellings round its orifice. Seeds brown, rugged, rather covered with hard tubercles than wrinkled —two, three, or four, but generally three, with one abortive; when there are four seeds, two are found abortive, and six divisions in the calyx.

This plant flowers from May to July, and in some places it is pretty abundant. Being annual, the seeding only has to be guarded against, and the wheat crops being drilled, the blossomed plants must be pulled by hand. The seeds are not numerous, and a well-executed summer fallowing of the land will do much in eradicating the tribe of sparingly-seeded plants.

9. RAGWORT,

Or the "Senecio" of botany, is a very common weed in Britain, and grows in most soils and situations. The plant belongs to the class and order Syngenesia polygamia superflua of Linnæus, and the natural order "Corymbiferæ" of Jussieu.

Generic character: Common calyx—calyculate, conical, truncated; scales, awl-shaped, numerous, parallel, and contracted into a cylinder at the upper part, contiguous, equal, not so numerous at the base, but imbricated, withering at the tip. Corolla compound, higher than the calyx; florets of the disk perfect, tubular, numerous, funnel-shaped, with a five-cleft reflexed limb; those of the radius, if any, female, ligulate, oblong, slightly three-toothed. Stamina—in the perfect florets, filaments five, capillary, very small; anthers cylindrical, tubular. Pistil, in all the florets, germen ovate; style thread-shaped, the length of the stamens; stigmas two, oblong, revolute. Pericarp none, except the conical, converging calyx. Seeds in both kinds of florets alike, solitary, ovate, crowned with capillary long down. Receptacle naked, flat.

Essential character: Receptacle naked. Down simple. Calyx cyclindrical, many-leaved, equal, scaly at the base. Scales dead at the tip.

The "Senecio vulgaris," or "common groundsel," belongs to the first section of the genus. "Flowers without a radius," scattered. Leaves situated in a pinnate form, toothed, embracing the stem. Root annual, fibrous. Stem erect, branched, leafy, somewhat panicled, round, angular, either smooth, or clothed with a cottony down like the back of the foliage. Leaves alternate, bright green, radical ones stalked; those of the stem sessile, auriculate. Flowers terminal, scattered, or panicled, yellow. Seeds furrowed, pubescent, more than 2,000 on one plant: Seed—down sessile, rough. The great peculiarity in the genus "Senecio," of having the scales of the calyx withered, is very conspicuous in the present species, whose flower buds and young tops are the food of many small birds, both wild and domestic.

The common Groundsel flowers throughout the year, almost in any soil and situation. It delights most in soft, damp situations, as compost heaps of earths, or land of the above texture. The root being annual, it only remains to prevent the seed being perfected, by very careful and repeated hoeings and scuffling of the drilled crops. Where such weeds are very numerous, the best way is to cut them with the hoe when in full flower, and carry them off the field.

10. SOWTHISTLE,

Or "Sonchus" of botany, sometimes grows luxuriantly among corn crops. The plant belongs to the class and order "Syngenesia Polygamia Æqualis" of Linnæus, and the natural order "Cichoraceæ" of Jussieu.

Generic character: Common calyx, imbricated, bellying, of numerous linear, unequal scales; corolla, compound, imbricated, uniform; florets all perfect, numerous, equal, of one petal, ligulate, linear, abrupt, with five teeth. Stamina—filaments five, capillary, very short; anthers united into a cylindrical tube. Pistil — germen nearly ovate; style thread-shaped, the length of the stamens; stigmas two, reflexed. Pericarp none, except the calyx, closing in to the form of a depressed globe, with a conical point. Seed solitary, rather oblong, down, capillary, sessile. Receptacle naked.

Essential character: Receptacle naked, calyx imbricated, swelling at the base. Seed, down, simple, sessile.

The "Sonchus arvensis," or "Corn Sowthistle," is a frequent weed in damp loams. The root is creeping, fleshy, and milky, running deep into the ground, and difficult of extirpation.

The "Sonchus oleraceus," or the common "Sowthistle," is much more abundant than the former species, and is a very common weed in cultivated lands. Flower-stalks downy, imperfectly umbellate; calyx smooth; leaves runcinate, toothed. Root annual, spindle-shaped. Herbage smooth, brittle, milky, very various with respect to luxuriance, and the number of teeth, lobes, or prickles about the edges of its leaves; their segments, however, are almost always acute and runcinate. Flower-stalks axillary, terminal, rather cymose than umbellate, clothed when young with soft, white, dense, cobweb-like deciduous down. Corolla lemon-coloured. Seeds angular, with crenate ribs, numerous, upwards of 11,000 on one plant.

"Thistles" are easily eradicated by a careful attention in killing the roots, and by preventing the perfection of seeds in cutting the stems when the flowers are in blossom. The seeds are numerous, and are easily carried about by the wind, and consequently no plants must be allowed to grow on the hedge sides and ditch banks; for lanes and roadsides often produce seeds to infest the adjoining fields.

11. KNOT GRASS,

Or the "Polygonum" of botany, is not an uncommon weed on tillage lands. The plant belongs to the class and order "Octandria Trigynia" of Linnæus, and the natural order "Polygoneæ" of Jussieu.

Generic character: Calyx—perianth inferior, of one leaf, turbinate, internally coloured, in five deep, ovate obtuse, permanent segments. Corolla none, unless the calyx be taken for such. Stamina—filaments, generally eight, awl-shaped, very short; anthers roundish, incumbent. Pistil — germen superior, triangular; styles, mostly three, thread-shaped, very short; stigmas simple. Pericarp none, the calyx folding over the seed. Seed one, acute, with three, rarely only two, angles.

Essential character: Calyx, in five deep segments, coloured, petal-like, permanent. Seed one, superior, angular, covered by the calyx. Stamens and styles uncertain in number.

The most common species is called "Aviculare," from the gratefulness of its seeds to small birds. It grows in great abundance on roadsides, on sandy and gravelly soils, and also on cultivated fields, and covers much ground where the natural plants have been destroyed. The flowers are axillary, styles three. Leaves elliptic, lanceolate, rough-edged; ribs of the stipules remote; stem procumbent, herbaceous. The crimson flowers are very numerous, and very beautiful under a magnifier. The root is annual, and of an astringent taste, and once reckoned of some medical virtue, but now wholly superseded. All quadrupeds are fond of the plant, and hence it is called "knot-grass," although it bears no resemblance to the real grasses.

The seeds are numerous, and the habits are trailing, and the mode of extirpation consists in preventing its seeding, by a timely cutting of the plants. It is not among the most toublesome of weeds.

The Black Bindweed, or "Polygonum convolvulus," is often found as a weed on cultivated fields. It is annual, and twines round the stems of plants to the height of three feet or more, with a stem roughish, angular, and somewhat branched. The prevention of the seeds being perfected, by means of a careful and constant culture, is the sure means of eradication.

12. FUMITORY,

Or the "Fumaria" of botany, is a common and very abundant weed on soft loams of the best quality. The plant belongs to the class and order "Diadelphia Hexandria" of Linnæus, and the natural order "Papaveraceæ" of Jussieu.

Generic character: Calyx—perianth inferior, of two equal small leaves, mostly deciduous, often coloured. Corolla tubular, ringent, of two petals, each lobed and spreading at the extremity, gibbous, and holding honey at the base, variously formed in different species. Stamina—filaments six, capillary, united into two sets by their broad, elongated, membranous bases, sheathing the germen; anthers small, roundish, vertical. Pistil—germen roundish or oblong; style curved or oblique; stigma obtuse. Pericarp—pod of two valves and one cell. Seeds one or more, roundish.

Essential character: Calyx of two leaves, inferior; corolla ringent, gibbous, and honey-bearing at the base, each filament bearing three anthers.

The "common fumitory," or "Fumaria officinalis," flowers from April to August, and later, with very elegant pink blossoms, variegated with spots of dark red and of green. Pericarp one-seeded, racemed; stem diffuse. It is annual, but not reckoned a very troublesome weed, though often very abundant on good soft loams. After being cut by the hoe in the drills, the plants should be carried off the field, as in damp weather the roots again take hold; and the seeds are perfected after the cultivated plants are full grown and the culture has ceased. This method of carrying away the plants applies to many annual weeds, which are generally of a vivacious nature.

13. MELILOT,

Or the "Trifolium melilotus" of botany, is a very troublesome weed in some corn-growing districts. Legumes naked, racemed, two-seeded, wrinkled, acute; root annual, strong, woody; stem upright, grooved, yellowish-green, two feet high or more, with spreading alternate branches.

The Melilot clovers form the first division of the genus, having the legumes naked and many-seeded.

This plant grows wild in most parts of Europe by waysides, in pastures, and in corn-fields. It is a very injurious corn weed; flowers in June, and the seed ripen with the corn; and being ground with the grain, the flour of wheats gets a strong and unpleasant taste. But it is a good pasture plant: horses are very fond of it; cows, sheep, and swine eat it; and bees delight to draw its nectary. It propagates very readily by the root and seeds, and therefore careful fallowing of the land by the modes already recommended becomes necessary for its extirpation.

14. FEVERFEW,

or "Pyrethrum" of botany, is a very common weed on corn fields. The plant belongs to the class and order "Syngenesia polygamia superflua" of Linnæus, and the natural order "Corymbiferæ" of Jussieu.

Generic character: Calyx hemispherical, imbricated, the scales close pressed, rather acute, membranous at the edges. Corolla compound, radiated; florets of the disk perfect, numerous, tubular, funnel-shaped, with five spreading segments—those of the radius more than twelve, female, ligulate, elliptic, oblong, three-toothed. Stamina in the perfect florets—filaments five, capillary, very short; anthers united into a cylinder, hardly so long as the corolla. Pistil—germen in all the florets, obovate; style thread-shaped, longer than the stamens; stigmas two, divaricated, abrupt; pericarp none, the calyx remaining unaltered; seeds nearly alike in all the florets, oblong, quadrangular, each crowned with an erect membranous more or less lobed border; receptacle naked, dotted, convex.

Essential character: Receptacle naked; seed crowned with a membranous margin; calyx hemispherical, imbricated with sharpish scales, bordered with a membrane.

The "corn Feverfew" or "scentless May weed," the "Pyrethrum inodorum," has the leaves pinnate in many capillary segments; stem branched, spreading; seed, crown entire; root tapering, annual; branches somewhat corymbose, each terminated by a rather large flower with long white rays and a prominent yellow disk.

This weed grows mostly on gravelly soils, and flowers in autumn. Cutting up the plants by the hoe in drilled crops will prevent the seeds being perfected; and when perfect seeding does happen, the seed must be very carefully separated from the grain by winnowing, and destroyed by burning.

15. MARIGOLD,

or the "Chrysanthemum" of botany, is a very troublesome weed in some soils. The plant belongs to the class and order "Syngenesia Polygamia Superflua" of Linnæus, and the natural order "Corymbiferæ" of Jussieu.

Generic character: Calyx common, hemispherical, imbricated; interior scales larger by degrees, innermost membranous. Corolla compound, radiated; florets of the ray female, and strap-shaped—of the disk hermaphrodite, funnel-shaped, spreading the length of the calyx. Stamina five, capillary, very short; anthers forming a hollow cylinder. Pistil—germ egg-shaped; style filiform, longer than the stamens; stigmas two, obtuse, revolute; seeds, one to each floret, oblong, not crowned with a marginal rim; receptacle naked, dotted, convex.

Essential character: Receptacle naked; seed without a marginal ring; calyx hemispherical, imbricated; scales dilated at the margin, membranous.

The "Corn Marigold," or the "Chrysanthemum segetum," has the leaves embracing the stem, glaucous, laciniated near the summit, toothed at the base; root annual, spindle-shaped, small; stem one or two feet high, branched, angular; leaves oblong, variously toothed or pinnatifid, laciniated, rarely entire; flowers large, terminal; scales of the calyx with a broad, membranous edge; florets of the ray inversely heart-shaped, spreading; seeds furrowed.

The plant is annual, and flowers from June to October. It has many provincial names—corn marigold, yellow or golden cornflower, yellow bottle, buddle, or the yellow bottle in Norfolk; golds, goulds, or gowls in the midland counties; goulans or goldins in the north of England; and gules, gools, guils, or yellow gowans in Scotland, from the golden colour of the flowers. The seeds are very plentifully produced, which vegetate wherever the land is cultivated, and may be very easily destroyed, like other annual seedling weeds, by early and complete fallowing, to bring the seeds forward, and then destroying the plant. The root being annual, the production of seeds has only to be guarded against.

16. BLUEBOTTLE,

Or the "Centaurea" of botany, is sometimes found as a weed on corn-fields. The plant belongs to the class and order "Syngenesia polygamia frustranea" of Linnæus, and the natural order "Cinarocephallæ" of Jussieu.

Generic character: Calyx common, imbricated roundish scales variously terminated. Corolla—compound floscular florets differing in form; those of the disk hermaphrodite, numerous; those of the ray fewer, loose, larger, funnel-shaped, constantly abortive; tube of the hermaphrodite florets filiform, border bellying, oblong, erect, terminated by five linear erect segments; tube of the abortive florets slender, gradually enlarging; recurved border oblong, oblique, unequally divided. Stamens of the hermaphrodite florets: filaments five, capillary, very short; anthers united into a hollow cylinder the length of the petal—of the abortive florets none. Pistil of the former; germ small; style filiform, the length of the stamens; stigma very obtuse, projecting in a point, in many species bifid—of the latter: germ very small, style scarcely any, stigmas none. Seeds of the fertile florets solitary; down in most species, feathered or capillary; receptacle bristly.

Essential character: Receptacle bristly; florets of the ray funnel-shaped, longer, abortive.

The "corn centaury" has a stem one or two feet high, erect, much branched, somewhat woolly; calyxes serrate; leaves linear, quite entire, the lowest toothed; root annual, fibrous, black; leaves linear, lanceolate, acuminate, somewhat woolly; root leaves entire; lower stem leaves often pinnatifid or toothed, upper ones always entire; flowers terminal, solitary, peduncled; florets of the disk purplish, regular; anthers black; florets of the ray funnel-shaped, always blue when wild; calyx egg-shaped, scales lanceolate. Seeds even, down, many leaved, unequal, scabrous, reddish. It flowers from June to September, and is easily extirpated by constant hoeing to prevent the perfecting of seeds; and the root being annual, there is no dread of propagation from that organ. The oldest writers notice this plant, and it has been mentioned under various names. It is not very abundant in the growth, but the appearance attracts notice.

17. CHAMOMILE,

Or stinking May-weed, the "Anthemis" of botany, belongs to the class and order "Syngenesia polygamia superflua," of Linnæus, and the natural order "Corymbiferæ" of Jussieu.

Generic character: Calyx common, hemispherical; scales linear, subequal; corolla compound, radiate; corollules hermaphrodite, tubular, numerous in a convex disk; females, more than five in the ray. Proper of the hermaphrodite, funnel-shaped, fine-toothed, erect; of the female, ligulate, lanceolate, sometimes three-toothed. Stamina in the hermaphrodite—filaments, five, capillary, very short; antheræ, cylindrical, tubular. Pistil in the hermaphrodites: germ oblong, style filiform, the length of the stamens; stigmas two reflex—in the females: germ oblong, style filiform, the length of the hermaphrodites; stigmas two, revolute. Pericarp none; calyx unchanged. Seeds solitary, oblong, downmargined or none, receptacle chaffy, convex or conical.

Essential character: Receptacle chaffy, down none; calyx hemispherical, nearly equal, floscules of the ray more than five.

The "corn chamomile," or the "Anthemis arvensis," has the receptacles conic; chaffs bristle-shaped, seeds crown-margined, leaves thinly-downed. Root annual or biennial. Flowers in June and July. As this plant produces an abundance of seeds, and the root often lasts for two years, the extirpation of it requires a double care in gathering the roots by hand picking of the fallowed lands, and to prevent the perfecting of the seed by cutting and pulling the plant during its growth. In drilled grain crops the weed will appear in bulk, though not in flower, to be pulled by hand before the crop shuts out any access of operation.

18. HOG-WEED,

Cows parsnip, "Heracleum" of botany, is a weed very often found in low damp meadows of soft ground. The plant belongs to the class and order "Pentandra digynia" of Linnæus, and the natural order "Umbelliferæ" of Jussieu.

Generic character: Umbel of many rays, very large, partial, flat; general involucre of many leaves, deciduous, partial, halved on the outside; its leaflets from three to seven, linear lanceolate, the outer ones longest. Perianth scarcely discernible. Corolla universal, not uniform, radiated. Flowers for the most part all fertile, partial; of the disk, equal, of five, inflexed, hooked, emarginated petals; of the radius, unequal, of five, oblong, hooked petals, the outer ones largest, and most deeply cloven. Stamina—filaments five, larger than the petals of the disk; anthers small. Pistil—germen inferior, nearly ovate; styles two, approximated, short; stigmas simple. Pericarp—fruit elliptical, compressed, emarginate, striated on each side in the middle. Seeds, two, ovate, compressed, somewhat leafy at the edge.

Essential character: Fruit elliptical, notched, compressed, striated, dilated in the margin. Flowers radiant; petals notched, with an inflexed point; general involucre deciduous.

The "common cow's parsnip," or "Heracleum sphondylium," has the leaves pinnate or ternate, hairy, downy, and whitish beneath; leaflets dilated, pinnatifid, cut, and serrated, heart-shaped at its base. The root is annual or biennial, tap-shaped, whitish; stem erect, branched, leafy, stout, hollow, furrowed, and rough, about *four feet* high. Dr. Sibthorp found it in Greece, growing in wet places, as mentioned by Dioscorides. It is a native of most parts of Europe, and forms a genus of the most gigantic umbelliferous plants. It flowers from May to July. The leaves are a favourite food with rabbits and swine; kine, goats, and sheep also eat them, but horses are not fond of them.

This weed may be gradually weakened and ultimately destroyed by annually cutting it in its early growth. The tap roots may be split and destroyed by pushing salt down the incisions; and the whole roots may be dug up in a conical turf of earth, the root and rootlets carefully separated and removed, when the earth is filled into the hole, and the grass turf relaid. This plan will be the quickest and the most certain.

19. YELLOW RATTLE.

Or the "Rhinanthus" of botany, is a very common weed on moist meadows. The plant belongs to the class and order "Didynamia angiospermia" of Linnæus, and the natural order "Pediculares" of Jussieu.

Generic character: Calyx, perianth inferior, of one leaf, roundish, inflated, compressed, four cleft, permanent; corolla of one petal, ringent, tube, rather cylindrical, the length of the calyx; limb gaping, compressed at the base; upper-lip helmet-shaped, compressed, emarginate, narrower; lower spreading flat, trifid half way down, obtuse, the middle segment broader. Stamina — filaments four, the length of the upper-lip, the two shorter ones concealed under it; anthers incumbent, cloven on one side. Pistil—germen, superior, ovate, compressed; style thread-shaped, longer than the stamens, but standing between them; stigma obtuse, inflexed. Pericarp: capsule obtuse, erect, compressed, of two cells and two valves, gaping at the margins; partition contrary. Seeds numerous, compressed.

Essential character: Calyx inflated, compressed, fourtoothed. Upper lip of the corolla compressed. Seeds imbricated, flat.

The "Cockscomb yellow rattle," or the Rhinanthus crista galli, has the root annual, small, with small fibres. The whole plant is smooth. Stem, a foot or more in height, four-cornered, mostly stained with dark purple; leaves in pairs; spike terminating, leafy. Bractea like the leaves, only broader at the base, and more deeply cut in. Flowers not always strictly opposite, on short peduncles. Calyx remarkably large, inflated, of a pale greenish yellow colour, with strong ribs, and a network of veins. Corolla twice as long as the calyx—yellow, except the tube, which is white, and the anterior edge of the upperlip, which is dirty blue; anthers awnless, but very hairy; germs smooth, surrounded at the base by membranaceous nectary. Capsule rounded, emarginate at the top, two-celled, two-valved. Seeds from eight to twelve in each cell, kidney-shaped. It flowers in June.

This plant gets the name of "Yellow Rattle," from the rattling of the ripe seeds in the capsule; and for the same reason it is called "Rattle Boxes" in Ireland. It is sometimes called "Penny Grass," and in Yorkshire "Hen Penny," from the shape and size of the seed-vessel, like a silver penny. The name of "Cockscomb" is derived from the appearance of the upper leaves or bracts which accompany the flower. Having no quality to recommend it for grazing, it should be carefully extirpated by the meadow being grazed for three or four years, to prevent the seeding, and by cutting with the scythe any plants that may escape the bite of the grazing animals. It shoots up into seed stems. The root is annual, or at most biennial.

20. EYEBRIGHT,

or the Euphrasia of botany, grows very abundantly on dry pastures. The plant belongs to the class and order Didynamia Angiospermia of Linnæus, and the natural order "Pediculares" of Jussieu.

Generic character: Calyx—perianth of one leaf, inferior, cylindrical, four-cleft, equal, permanent. Corolla of one petal, ringent, tube as long as the calyx; upper lip concave, notched--lower, spreading, deeply three-lobed, its lobes equal and obtuse, notched. Stamina—filaments four, thread-shaped, situated close under the upper lip; anthers of two lobes, the lobes unequally spinous at their lower extremities. Pistil—germen superior, ovate; style thread-shaped, agreeing in form and situation with the stamens; stigma obtuse, undivided. Pericarp—capsule ovate, oblong, compressed, of two cells and two valves; the partition contrary to the valves. Seeds numerous, minute, roundish, longitudinally striated.

Essential character: Calyx—cylindrical four-toothed, equal: upper lip of the corolla cloven—lower three-lobed, the lobes cloven. Anthers bearded, with unequal spines. Capsule, ovate, oblong. Seeds striated.

Two species abound in British pastures—the "Common eyebright" or the Euphrasia officinalis, and the "Red eyebright" or the Euphrasia odontites. The former has the leaves ovate, marked with lines, sharply toothed; root annual; stem from two to four inches high, or more; upright, round, hoary, purple, for the most part branched, in opposite pairs. Leaves opposite, sessile, obtuse, convex above, concave beneath, finely ciliate about the edge, slightly hirsute on each side, above somewhat glossy. Flowers from the axils of the leaves, on short peduncles, opposite, forming a spike or raceme at the tops of the branches and stem. It differs much in size and colour of the corolla, which varies to quite white and yellow; it is more or less branching, and sometimes wholly unbranched. It seems to have been unnoticed by the ancients, and there appears to be no foundation for the old notion of its being useful in disorders of the eyes.

The plant flowers from July to September, and grows very common on heaths, and other dry pastures, especially on a chalky soil. It sheds a fair quantity of ready growing seeds; and the root being annual, the prevention of seeds being perfected offers the only way of eradicating the plant. Top-dressings, with well-prepared composts, have always the effect of banishing weeds, and of bringing forward the useful grasses. Close grazing of the land with sheep has the same effect, and the folding of the animals regularly over the field will produce a very good herbage, which will last for several years. This is a very cheap and effectual mode of restoring neglected and worn-out pastures, where, for special reasons, the ploughing up of the sward is omitted or forbidden.

21. TREACLE MUSTARD,

Or the Thlaspi of botany, is not uncommon as a weed in meadows and pastures. The plant belongs to the class and order Tetradynamia Siliculosa of Linnæus, and the natural order Cruciferæ of Jussieu.

Generic character: Calyx—perianth inferior, of four, ovate, concave, somewhat spreading, deciduous leaves. Corolla—cruciform, equal, of four obovate petals; twice the length of the calyx, with narrow claws. Stamina—filaments six, but half the length of the corolla; the two opposite ones still shorter; anthers pointed. Pistil—germen superior, roundish, compressed, emarginate; style simple, the length of the stamens; stigma obtuse. Pericarp—pouch compressed, inversely heart-shaped, emarginate, the style being mostly the length of the notch, in which it stands; of two cells; the partition lanceolate; and the valves boat-like, with more or less of a dilated keel. Seeds—several in each cell, pendulous, inserted into the sutures; roundish, compressed.

Essential character: Pouch compressed, emarginate, inversely heart-shaped; its valves boat-like, keeled. Seeds—several.

"The common penny cress," or smooth Mithridate mustard, or the Thlaspi arvense, has the pouch orbicular, compressed, entire at the base. Leaves oblong, toothed, smooth. It is annual, and flowers in June and July. The root is small and tapering. The whole plant is smooth; above a foot high, branched. The stem leafy, angular upwards. Leaves two or three inches long, clasping the stem with their arrow-shaped bases; their edges wavy and toothed. Flowers numerous, small, white. Pouch large, erect, almost perfectly orbicular. Seeds numerous. The warm, pungent taste of the plant is combined with a disagreeable garlick-flavour.

The root being annual, it only remains to guard against the perfecting of the seeds by frequent cutting of the growing stems with the scythe.

22. GOOSE-GRASS,

Or "Ladies' Bedstraw," is the Galium of botany—a plant of the class and order Tetrandria monogynia of Linnæus, and the natural order Rubiaceæ of Jussieu.

Generic character: Calyx—perianth superior, minute, of four equal teeth; sometimes wanting. Corolla, of one petal, wheel-shaped, deeply four-cleft, acute; tube, scarcely any. Stamina—filaments four, awl-shaped, inserted into the corolla, shorter than the segments; anthers simple. Pistil—germen of two grains; style thread-shaped, cloven halfway down, as long as the stamens; stigmas globose. Pericarp two dry cohering globose berries; seeds solitary, large, kidney-shaped.

Essential character: Corolla of one petal, flat, superior. Seeds two, roundish.

The present notice is the Galium aparine, or common rough "Ladies' Bedstraw," and has many names, as "Cleavers," "Clevers," "Clivers," "Catchweed," or "Scratchweed;" also "Hariff," or rather "Hairrough," from its roughness; and from being a favourite food or medicine of geese, it has been called "Goose-grass," "Goose-share," and "Gosling weed." The plant grows commonly in hedges and on cultivated grounds, and is well known by adhering to whatever it comes in contact with; and hence the names that have been first mentioned. The succulent plant has no smell; but the taste is bitterish, and somewhat acrid. Flowers in May and June, throughout the summer, and part of autumn. Leaves in eights, lanceolate; keels scabrous, with prickles pointing backwards. Joints villose. Root annual. Stem four feet high, or more, weak, and supporting itself upon other plants; brittle-jointed; the joints villose at the base; the angles are set with pellucid prickles, pointing downwards. It is very much branched, and the branches are opposite. Leaves six or eight in a whorl, eight to ten, or four to seven, according to various authors.

This genus of plants, chiefly European, have long been reckoned to be medicinal, curdling milk, removing the impurities, and good in scorbutic, scrofulous, and cutaneous affections. The seeds have seen substituted for coffee. The roots will dye red, and tinge the bones of birds with the same colour. The tops are an ingredient in broths, in order to purify the blood.

The weed is very troublesome in young quickset hedges, which it frequently overgrows and chokes. Hence the growth intrudes into ploughed lands. But, being annual, it is easily destroyed by being cut or plucked up early; for it begins to seed in June. The seeds are round, and very rough, and attach themselves readily to flannel screens, by which means corn may be cleansed from them. When the autumn vegetation of the seeds takes place, the plants are generally killed by the winter ploughing. The seeds that survive the winter produce the pests of the farmer, in scrambling, climbing weeds, that seldom fail to make way through the thickest masses of foliage, obtain a serious hold, and drag down the crop. The plant is seldom found on strong clays, and chiefly on good light and porous loams. Where it has been largely introduced by neglect, the weed is very troublesome and pernicious, but is easily managed by constant care and effort.

The above list of annual weeds will be found to comprehend the chief plants of that designation which infest the cultivated lands that are used in grass or in tillage. The frequency and size of plants compel the notice of their existence, as objects that impart any damage by their presence: the very smallest vegetable growths are beneath that observation, by reason of the minute existence not rising in opposition to other plants that are more specifically valuable. This consideration has been duly remembered in compiling the list now given of annual weeds, in which the descriptions, properties, and appearances have been selected with care, and stated with the utmost possible conciseness. The modes of extirpation are the results of practical experience, and the most approved and efficient.

(To be continued.)

ON THE MANAGEMENT OF HORSES.

SIR,—As it is from proper treatment when young that much of a horse's future value may be anticipated, and consequently the profit or loss that will accrue from the pursuit of breeding, we cannot attach too much importance to every item calculated to secure the desired object. The most profound judgment may be exercised in selecting useful and valuable animals for the purpose of perpetuating the species; every attention may be devoted to the progeny; everything connected with the speculation may be progressing propitiously, and the superstructure may be destroyed by a single act of inadvertency. It is preparing the young stock by degrees —imperceptibly, as it were—for the work for which they may be adapted, that facilitates their maturity, and secures them in a great measure from casualties and infirmities which must be expected in those which are called upon to perform hard labours without proper and systematic preparations. It is the proportion of exercise or work that each animal is capable of enduring at certain ages, and under certain circumstances, discreetly directed, that will contribute greatly towards making them robust and useful. Many of the practices very commonly adopted when breaking in young horses are calculated to produce inconceivable injuries, and add to the category of items other reasons to those already mentioned, for the discredit that has been expressed concerning our present breed of horses. Breeders may rest assured we are in possession of the material, if they will adopt the proper means of manufacturing it. The plan of breaking colts which is open to so much censure is something according to this fashion: the poor creature, when three or perhaps four years old, emaciated by the scanty provision upon which he has been sustained during the winter, in a cold farm-yard, without adequate shelter or exercise of any kind, is dispirited and weak: in that plight he is pronounced, and with perfect truth, not to be in a fit state to undergo the exertions which naturally attend the process of breaking. In the month of May he is turned into a pasture field, to fill himself to repletion with succulent herbage, and he becomes fat. The most suitable time of the year for the purpose now under consideration is lost. The exercise which the animal takes under such circumstances is very inconsiderable. However large pasture fields may be, horses very seldom move faster than a walk in search of their food, unless urged by some exciting cause. In this state, about the middle or latter end of August—before which period the tutelage of the animal ought to have been completed —it is now to be commenced with. The colt-breaker is called in, and a bargain struck for his services. The remuneration being inadequate, the poor animal suffers in the first instance, and his master in the end. The first task the colt is put through is lunging, which, instead of being confined to the moderate duties of a lesson, is extended to very hard work. The colt-breaker has not time to treat his charge considerately, and he hurries on with his undertaking regardless of all consequences, except that of reducing the animal to subjection in the shortest time possible. In the course of a day or two the poor creature is backed and ridden. Fat, and unaccustomed to exertion, to use a familiar expression, he melts like butter in the sun. His system is not in a fit state to bear the arduous tasks imposed upon him, and his limbs fail. Replete with the humours he has acquired at grass, the arterial system is deranged, and, participating in the general debility, the legs fill, and give unequivocal testimony of established weakness. Is it to be wondered at that the joints should become hot and inflamed, or even that lameness should ensue? Before the education is half completed, rest becomes imperative. The animal is again turned out, and doomed to pass another winter of privation and indolence. The succeeding summer the process of breaking is renewed, when it is supposed the young horse, having attained a greater age, has gained more strength; but, not having been well kept, maturity is not established in the ratio it ought to be. The colt-breaker has now another pretext for an extra charge; so that his fees at last amount to nearly, if not quite, the regular average. After a few hasty lessons, the young horse is reported perfectly quiet to ride, that he will carry master as quiet as a sheep, and forthwith master rides him to fairs, markets, and other places, sometimes going long distances, and at others not giving the animal work or exercise at all. When not required to be ridden, the young horse is turned out. Under such treatment, no animal can be in condition. In his paces he will be raw and uncultivated. If sold, it must be at a low price, commensurate with the intrinsic value, or he must be kept as the farmer's riding nag. In either of those cases, the breeder is dissatisfied, and condemns the speculation as an unprofitable investment, which, with such management, undoubtedly it is. But now let us consider what results may be expected from more rational treatment. If properly kept during the winter, with a comfortable hovel or loose box for shelter, and a convenient place—either a yard, paddock, or small dry pasture field—for exercise whenever the weather is inviting, and regularly supplied with a moderate allowance of corn and hay, the young horse will be in a fit state to be placed under the care of the breaker at an early period of the spring. Thus much time is gained. That functionary being adequately requited for his services, should be strictly enjoined not to exceed the limits of moderation in lunging his young pupil. That is a species of exercise, when properly restricted, highly beneficial; it renders the horse active, docile, and familiar: but if, as too often happens, it is practised to excess, it causes him to be dull, dispirited, and of a sulky temper. The breaker having performed his part, the animal may be used for riding about the farm, short journeys, and for any kind of light and easy work. His services are now equivalent to his keep; and being brought to this kind of use at an early age, the additional expense which has been bestowed upon him for the winter's keep is more than compensated. The following winter he should be kept at moderate work, after which it may be expedient to effect a sale; or, if the maximum of his value is to be realized, and he is very promising, it may be advisable to keep him till he is five years old, up to which time, proper work and good riding will enhance his value.

Much may be done with young horses in the way of cultivating their good manners and forwarding their education—or breaking, as it is usually termed—before the aid of the colt-breaker is required. The extent to which this is capable of being accomplished must depend mainly upon the nature of the establishment. If it be one of magnitude, an efficient and experienced servant forms a necessary portion of the concern, and he will probably be capable of conducting the ordeal of breaking without the assistance of one who makes it his profession. Foals should be accustomed to familiarities, fondling, and kind usage, from their birth; and if that kind treatment be continued as they grow up, they will occasion very little trouble when the time arrives for them to be broken. Before that operation is commenced, it is desirable that a bit should be placed in the young animal's mouth. Any plain snaffle of sufficient substance answers the purpose. There should not be any reins attached to it; it should be merely suspended by the head-piece. The colt will thus learn to play with the bit, which will tend very materially to the establishment of a good mouth, care being observed that the bit is suspended evenly by the proper length of the head-piece. This may be adjusted by any quiet, good-tempered person to whose care the young creature is intrusted, and may be left on from one to two hours daily. A loose box, hovel, or small yard is the most suitable place for the purpose. It would be inapplicable to these columns to enter into all the details and minutiæ of breaking; but I will mention that it is a very bad custom, though a very prevalent one, when a young horse is first bitted, to make use of reins, which are drawn tight. A colt breaker, when employed, should therefore be cautioned against it, for it will cause the pupil to contract a habit of leaning on the bit, and probably create a one-sided mouth. By such treatment, many colts will take a position in one corner of the box or hovel, and there stand and sulk; whereas if the bit be used as I have recommended, they will champ and play with it freely, thereby promoting that sensibility of mouth which is essential to future perfection. Breaking to harness may be considered necessary with such horses as are adapted for carriages; and their services after they are three years old may be advantageously called in requisition on the farm. Their first introduction should never be to a noisy, heavy cart. The plan which I have adopted with invariable success has been to put the harness on so that the animal may become quite familiar to it in the stable, after which I have a cord attached to each trace. The horse is then led out by an assistant, and another man with the cords in his hands offers a slight resistance as the animal moves forward; by this initiation the alarm frequently occasioned by the pressure of the collar against the shoulders is avoided, as the man who holds the cords can instantly relax them if necessary. After two or three lessons of this kind, neither trouble nor danger need be apprehended in putting the animal to any employment calculated for the advancement of his education in the art of drawing.

Young horses which are promising to make hunters should be taught to leap at an early age, during the process of breaking; by this custom much risk is avoided, and the animals are rendered by far more perfect in the accomplishment. Irish horses are proverbially good fencers; and the way they are made so, as I am informed, is in the following manner:—The breaker walks behind the colt with a pair of long reins, adjusted similar to those used for driving, and, with a whip in his hand, literally drives the animal over the fences: this may be very well, so far as teaching the pupil to jump; but it is attended with one very great disadvantage, for it inculcates a habit of stopping short as soon as the obstacle is cleared. Two evils arise from this: if the rider who is mounted upon a horse which has acquired that propensity is not on his guard, he will very probably perform a summersault in the air, to his own discomfiture and to the amusement of the spectators. Touching the second, a perfect hunter should go steadily, on most occasions rather slowly up to his fences; but on landing he should be quick on his legs, so that he may get into his stride with the least delay possible. The Irish system is not calculated to teach this method. The plan which I have always found the most successful has been to put a cavesson, with a long rein attached thereto, on the young one, and lead him over small fences; an assistant is in attendance with a whip, to be used only on emergencies. A few oats, an apple, or a piece of carrot, are appropriate rewards for good services. I must here introduce a caution when leading a horse over a fence—never to look him in the face. The stern gaze of a man's eye will abash any animal, and at a time when encouragement is desired it should be most scrupulously avoided. It should ever be remembered that those lessons which are attended by kindness are more quickly learnt and retained than those which are forced with severity. Coolness is one of the most important qualities in a good hunter, and that cannot be instilled unless the instructor possesses it himself; lessons which are accompanied by confusion, hurry, and violence must naturally inculcate alarm. One of the advantages of the leading-rein is that the horse is not suddenly checked the moment he is over the fence; and, if of sufficient length, it may be used for the purpose of teaching young horses to jump a few ditches to great advantage, by lunging them. Blind ditches should be frequently selected for tuition, always allowing the young horse plenty of time, which will enable him to feel for them with his feet, and he will soon learn the nature of the impediment. When a horse has cleared a fence neatly and carefully once or twice, he should not be required to repeat it; that should finish his morning's task, or he should be taken to one of a different kind. Neither should he be worked till he is weary, for nothing will more effectually beget carelessness. Many gentlemen exclaim—"The best method of making a hunter is taking him out with the hounds." I beg to differ from them. I have generally observed that those who make the observation ride horses which know their business before they purchase them.

Horses may be taught the first rudiments much more satisfactorily without hounds, when there is nothing to attract their notice but the object which they are required to accomplish. With hounds, there is constant excitement; and high-couraged horses will frequently acquire the bad habit of rushing wildly at their fences, and by so doing encounter many very unnecessary falls. A man, whether he be master or servant, may be the most careful and judicious rider in the world; he may ride his *protegé* quietly up to a fence with the intention of taking it coolly, when, just at the moment, up comes some hard-riding impetuous aspirant to notoriety, and rushes by the young one, to his utter confusion and dismay; this excites the emulation of the latter, and a fall or a scramble is the result. There are, likewise, many persons of high and low degree, having the characters of being first-rate performers over a country, who do not possess the talent of teaching horses. Few persons, in reality, possess the ability. The colt breaker is very frequently deputed to this office; but he is generally the worst individual that can be selected. With a thick skull, heavy hands, his daring attuned with gin, a sharp pair of spurs, and a tremendous whip, he sallies forth to make a high-couraged horse into a hunter. Highly excited by the novelties which surround him—the cry of the hounds, the galloping of other horses, the halloos, and the cracking of whips—the generous creature becomes impetuous. This the inconsiderate rider in vain attempts to restrain, by sawing away at the animal's mouth, which at length becomes insensible, but he is infuriated from pain; by this time the valour and the gin have made their escape simultaneously, and neither man nor horse is in a fit state to encounter a fence, much less to clear it with coolness and precision. Breeders, who are not sportsmen, would do far better by confining the hunting instructions of their horses to what they can teach them with the leading-rein, than by deluding themselves with the expectation that they will gain any benefit by having them ridden with hounds by colt breakers. Timber-jumping, which is an essential accomplishment in a hunter, cannot be taught so effectually by any other means as leading over a bar, stiles, and gates. After a young horse has been sufficiently broken, the breeder cannot adopt a better plan than that of riding him about his farm, occasionally taking him over little fences; this will teach him his business, and promote condition. The steadiest and best hunters I have ever met with have been treated in this manner; and when they are really accomplished they command a remunerative price. The very common complaints made by breeders and farmers, that they cannot obtain what they consider the full value of their horses, is in most cases unfounded. They allege that when gentlemen or dealers resell the same horses, they obtain more money. That is very true; but previously to doing so, the condition, appearance, and education of the animal undergo considerable improvement.

I am, sir, yours, most obediently,

CECIL.

ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

A WEEKLY COUNCIL was held on the 28th of March: present—Mr. MILES, M.P., president, in the chair; Sir Charles Lemon, Bart., M.P., Sir John V. B. Johnstone, Bart., M.P., Sir Robert Price, Bart., M.P., Mr. B. Almack, Mr. Hodgson Borrow, M.P., Mr. Bosanquet, Mr. Caird, Dr. Calvert, Mr. Chadwick, Mr. James Chapman, Mr. Corbet, Mr. Evelyn Denison, M.P., Mr. Deere, Rev. L. Vernon Harcount, Mr. Fisher Hobbs, Mr. Kinder, Mr. Majendie, Mr. Hall Maxwell, Mr. Pocock, Mr. Scott, Professor Simonds, Mr. Slaney, Mr. Vines, and Professor Way.

FRENCH AGRICULTURAL SHOW.—M. Herbert, the Consul-General of France in London, transmitted to the Council, on the part of the Minister of Agriculture and Commerce in Paris, an announcement of the Agricultural Show to be held in that city at the beginning of June next, and a schedule of the prizes and the conditions of competition in reference to foreign exhibitors. The following is a summary of the prizes offered in the first section, which includes cattle of foreign (that is, not French) breeds, imported into France for the purpose of the show, and having either French or foreign owners:—

Improved Short-horned cattle	£187
Other English breeds	233
Dutch, Swiss, and other breeds	233
Merino Sheep, pure and crossed	116
Dishley, New Leicester and other long-woolled sheep	116
South-Down, and other short-woolled sheep ...	116
Pigs, of large breed	47
Pigs, of small breed	53

The birth of all male animals in the classes of cattle and sheep must have occurred before the 1st of May, 1854; and that of females in those classes before the 1st of November, 1853. That of boars and sows must have occurred before the 1st of October, 1854. All animals condemned by the jury as being too fat will be excluded. The first prizes for cattle, sheep, and pigs will be accompanied in each case by a gold medal; the second prizes by a silver medal; and the other prizes by a bronze medal. The meeting will be held from the 1st to the 9th of June, during which period the French authorities will take charge of the animals and supply them with food. The French Government will pay the expenses from the frontiers to Paris, attending the conveyance of all stock sent from foreign countries. The reception of animals for the show will close at 2 P.M. on June 1st. The public exhibition will take place on the 5th and 6th of June. The entry of animals for the show will close on May 24.

The appointment of a deputation from the Society to the Agricultural Meeting of France was then suggested, and referred to the ensuing Monthly Council.

LABOURERS' COTTAGES.—Miss Banister, of Steyning, transmitted to the Society several models of cottages for labourers, with statements referring to their construction and peculiar advantages, for which the thanks of the Council were ordered. Mr. Slaney, at the request of the President, undertook to inspect these models, and to report upon them to the Council.

PRODUCTION OF BUTTER.—Prof. Way read to the Council a letter addressed to him by Mr. Horsfall, of Burley Hall, near Otley, on the amount of cream and butter he obtained in his dairy by the art icular management of his cows. This communication led to the expression of much diversity of opinion on the conditions under which the production and quality of milk are affected. Mr. Horsfall was requested to supply details of his management; and, on the motion of Mr. Caird, the further discussion of the subject was deferred until the second Wednesday in May.

LECTURE.—Prof. Way's lecture on the Atmospheric Influence in Reference to Vegetation was arranged to be delivered on the 25th instead of the 18th of April.

AGE OF HARES AND RABBITS.—With regard to the age of the hare and the rabbit, when the ears are dry and tough, the haunch thick, and the claws blunt and rugged, they are old. Smooth and sharp claws, ears that readily tear, and a narrow cleft in the lip, are the marks of a young hare. Hares may be kept for some time after they have been killed; indeed, many people think they are not fit for the table until the inside begins to turn a little. Care, however, should be taken to prevent the inside from becoming musty, which would spoil the flavour of the stuffing. A leveret is distinguished from a hare by a knob or small bone near the foot.

TOP DRESSING FOR DIFFERENT CROPS.

A monthly meeting of the Highland and Agricultural Society of Scotland was held in the Museum, on the 14th of March. The subject was "Top-dressing for different crops."

Mr. **Finnie**, Swanston, Mid Lothian, said—Previous to the sowing of crop 1854, the secretary of the Highland Society requested Mr. Hope, Fenton Barns, Mr. Russell, Kilwhiss, and myself, to undertake certain experiments with the view of testing the efficacy of nitrate of soda, sulphate of ammonia, Peruvian guano, and common salt, when applied as top-dressings to the growing crops, and to put ourselves in communication with Dr. Anderson, our chemist. Having done so, that gentleman, for reasons which he will this day explain to you himself, recommended the proportions of these substances which we adopted, and suggested that the crops to be selected for the experiments should be, wheat, grass intended for hay, and potatoes. The table which I shall first submit to you will show the results obtained on the wheat crop. Before reading over this table, however, I may state that the field from which the crop was taken had a southern exposure, was thoroughly and efficiently drained many years since, was under a potato crop in 1853, and that the wheat was sown in the middle of October of that year. The surface-soil is of medium depth and quality, and although partially intermixed with clay, easily pulverized, and rests upon a tenacious subsoil. The wheat was sown broadcast at the rate of three bushels per Scotch acre. I regret that this table has the defect of not pointing out what the produce would have been without any application, but as the remainder of the field received a top-dressing of nitrate of soda and sulphate of ammonia, a mistake occurred; and finding ultimately I could not with confidence introduce into my calculation the intended undressed portion, I resolved to exclude it altogether. Nevertheless enough appears to show in how far the application of one substance exceeds or falls short of another in the order of productiveness.

Wheat Table.—No. 1.

Substances.	Quantity per imp. acre.	Date of application.	Date when cut.	Date when stalked.	Quantity of good grain.	Quantity of weak grain.	Weight of good grain.	Weight of weak grain.	Weight of straw.
	lbs.				q. b. lb.	b. lb.	lbs.	lbs.	t. c. lb.
1. Nitrate of soda	112	April 15.	Sept. 8.	Sept. 24.	4 6 24	5 23	62½	60¼	1 18 15
2. Nitrate of soda Common salt	112 224	„	„	„	5 0 54	4 22	62	59¾	2 3 66
3. Sulphate of ammonia	87	„	„	„	5 0 20	4 20	62	59	1 16 61
4. Sulphate of ammonia Common salt	87 224	„	„	„	4 5 31	4 45	62½	60	1 17 30
5. Peruvian guano	137	„	„	„	5 2 42	4 18	62¼	59½	1 15 7
6. Peruvian guano Common salt	137 224	„	„	„	4 5 47	5 13	62½	60	1 11 26
7. Nitrate of soda Sulphate of ammonia Peruvian guano	37 29 46	„	„	„	5 0 8	5 29	62	59½	1 12 44
8. Nitrate of soda Sulphate of ammonia Peruvian guano Common salt	37 29 46 224	„	„	„	4 6 21	4 36	62¼	60½	1 8 64

The field in grass upon which the foregoing proportions were sown may be described as being very much of the same character of soil as the former, but with a northern exposure, while it had also been thoroughly and efficiently drained some years ago. In spring, 1853, the seeds intended for the hay crop, consisting of a mixture of red clover, perennial and Italian rye-grass, were sown. I shall now give the results—

GRASS TABLE.—No. 2.

Substances.	Quantity per imp. acre.	Date of application.	Date when cut.	Date when weighed.	Weight per imp. acre.
	lbs.				t. c. lb.
1. Nitrate of soda	112	May 2.	July 27.	August 7	2 12 31
2. Nitrate of soda	112	„	„	„	2 12 19
Common salt	224				
3. Sulphate of ammonia	87	„	„	„	2 7 38
4. Sulphate of ammonia	87	„	„	„	2 10 72
Common salt	224				
5. Peruvian guano	137	„	„	„	2 4 65
6. Peruvian guano	137	„	„	„	2 5 90
Common salt	224				
7. Nitrate of soda	37	„	„	„	1 17 54
Sulphate of ammonia	29				
Peruvian guano	46				
8. Nitrate of soda	37	„	„	„	2 3 48
Sulphate of ammonia	29				
Peruvian guano	46				
Common salt	224				
9. Nothing	—	„	„	„	1 15 54

I should observe, however, that as the weather was rather dry, both before and after the application, this circumstance was not very favourable for producing a full effect.

The potatoes upon which I experimented were planted upon a very light soil, naturally dry, and resting upon a whinstone rock. The horse and cow manure was applied in the drills at the time of planting, and the different special manures sown with the hand before the ridges were reversed. The table now produced gives the result—

POTATO TABLE.—No. 3.

Horse and cow manure applied per imp. acre.	Other substances applied per imperial acre.		Date applied.	Date raised.	Produce per imp. acre.
No. Tons.		lbs.			t. c. lb.
1. 20	Nitrate of soda	112	May 12	Oct. 20	5 11 40
2. 20	Sulphate of ammonia	87	„	„	4 18 23
3. 20	Peruvian guano	137	„	„	6 2 1
4. 20	Nitrate of soda	37	„	„	6 7 36
	Sulphate of ammonia	29		„	
	Peruvian guano	46		„	
5. 20	None		„	„	4 18 17

In submitting these tables, I beg it to be understood that, although, so far as I am aware, every process has been attended to with the strictest regard to accuracy, it is possible mistakes may have occurred; and notwithstanding that the land selected for each experiment was, in my opinion, nearly of a uniform character, still there may have been variations in the soil more or less at work, and practical farmers know well how very difficult it is, in fixing upon a grass crop with the view of testing the results of certain applications, to meet with such a regular admixture of clover, as not from that cause alone to have variations in the weight of produce per acre. While it is impossible, therefore, to hold these results as conclusive of what should regulate the practice of others, they will be attended with this advantage, which, perhaps, the Society has more immediately in view, viz., to stimulate to further enquiry, and thus, by obtaining a series of carefully recorded experiments, to throw the greatest possible amount of light on the effect of these auxiliaries to the ordinary farm-yard manure.

But it may be expected that I should state on this occasion how far the results in these tables corroborate my experience in former years. To do so satisfactorily, would involve a narration of circumstances most tedious and irksome; for as I have already indicated, different soils, and with less or more manure previously applied, have been and could only be treated as the particular case required. I shall better discharge my duty by briefly giving the general conclusions at which I have arrived, in the use of top-dressings; and shall first remark in my experience in their application to hay and pasture. In order that no misunderstanding may exist, I mean exclusively to refer to the artificial grasses—that is, annual and perennial rye-grass—with a mixture of clovers, when forming a break, or part of the rotation, where the land is kept under regular rotation. To both the hay crop, and likewise what has been in pasture for one or two years, I have applied top-dressings of nitrate of soda, sulphate of ammonia, guano, soot, and a list of other substances unnecessary to enumerate; but as no certain dependence can be placed on the weather, and it is essentially necessary to the success of the top-dressing, either to have a good fall of rain at the time they are sown, or immediately after, and as I could not detect on the second cutting any difference of a real pecuniary value, or that the succeeding corn crop was materially benefited, and as I also observed that when in pasture, it was only at the commencement of the season of the first year any very perceptible difference was manifest, I have ceased to consider their use, upon an average of years, and on an extended scale, a safe and satisfactory investment. I think it far better, where practicable, to bring up the land to the highest state of fertility previous to hay or pasture, by a judicious application of farm-yard manure, than to trust to the top-dressings as props for producing a good return. Considering it, however, to be a matter of some moment to obtain, a week or ten days earlier, a portion of what is intended to be cut green for the bestial on the farm, I regularly continue their use for that end, and even although failures should arise, the occasional success more than counterbalances it; but what might be the result when water is artificially applied, I do not at this time mean to discuss.

In giving the foregoing exceptional case as to the top-dressing of grass intended for cutting, I will now advert to what appears to me to be the principal inducement when the land is in pasture. In seasons when keep in spring is scarce, hardly any farmer can over-estimate the advantage of an early bite for part of his cattle or sheep stock, and hence this may become a sufficient reason why an outlay on special manures for top-dressing may be highly judicious; but the extent to which it may be safe and judicious to go must be left entirely to the forethought and judgment of the farmer himself. I have a permanent hill grassy land, and made repeated experiments with the different manures under consideration; but beyond some effect the first year, nothing permanent was observable. When grass is intended for early cutting, I have found nitrate of soda, when applied after vegetation is active in spring, and either during or immediately before a fall of rain, produce the most powerful effect. Sulphate of ammonia next, then Peruvian guano; and I would, therefore, for such a purpose, prefer the nitrate of soda at the rate of from one and a half to two cwts. per Scotch acre. For pasture, however, I would reverse the order, and place guano first, from being more permanent in its effects; and also as the grass from this manure springs again more rapidly after being cropped down by sheep or cattle early in the season, whereas the nitrate seems to expend itself in its first effort. To reap, however, the full benefit of guano, it should be sown by the middle of January, as, from actual trial, I have found that what was applied at that season gave a better return than in any after month, the weather at the time of each application being alike favourable. The quantity I usually employed was 3 cwt. per Scotch acre.

In offering a few remarks on the application of top-dressings to the cereal grains, I am disposed to express myself more decidedly, and say whether the object intended is to produce a more abundant crop or give more stamina to the straw, when apt to be over-luxuriant; such a selection can be made from the special manures patent to the agriculturist, as will prove remunerative, and for the wheat crop in particular, their use is attended with most important results. The soil of my farm is generally light, and the straw of this crop requires rather to be stimulated. I prefer using, therefore, a proportion of nitrate of soda, and this, when applied with a certain amount of guano, not only improves the crop in bulk, but adds considerably to the produce of grain per acre.

The quantity I employ may be said to be three-fourths of a cwt. of nitrate of soda, with from 1¼ cwt. to 2 cwts. of guano per Scotch acre, and that according to circumstances. If I anticipated an over-luxuriance of straw, I would substitute sulphate of ammonia or common salt. For barley sown upon land long under cultivation, and when the preceding turnip crop has been entirely removed, top-dressing rarely fails from making a profitable return; and under such circumstances a mixture of guano and dissolved bones or bone meal, in the proportions of one-half, and to the extent of from 2 to 3 cwt. per Scotch acre, has seldom proved unsatisfactory—or, in short, a manure well charged with phosphates; on land, however, rather below an average state of fertility, I believe guano or rape dust alone would be more answerable. When turnips are consumed on the ground with sheep, and the land is otherwise in fair condition, to stimulate the barley crop would be ruinous; but in that case some other substance may be selected with advantage that has a tendency to stiffen the straw. I have occasionally made trial of nitrate of soda, sulphate of ammonia, and saltpetre for this crop; but would not continue their use in my own practice, or venture to recommend them to others, as they invariably stimulate the straw with more loss than gain.

For the oat crop likewise top-dressings may be considered generally applicable; indeed, over a very large extent of the cultivated land of Scotland, when this crop is grown, their use might prove of the utmost importance; and I should think, so far as my own experience and observation enable me to judge, guano is the best of the special manures to employ. As in the case of wheat and barley, when the straw of this crop is likely to be in excess, an application to correct that tendency is also available.

In remarking upon the use of top-dressings for grass, I have laid considerable stress upon the state of the weather; fortunately, in regard to the cereal grains, the same objection does not to a great, if to any, extent apply; for I would observe that to obtain full effect, it is necessary that some stirring of the soil should take place at the time or as soon after the application as possible. To the wheat in spring this is easily accomplished by a turn of the harrows, which is even of itself beneficial to that crop; and for barley or oats they can be applied either at the time of sowing or immediately before a hand-hoeing, when the crop is drilled. Without going into the general subject of manures, I could not with propriety, at this time, refer to my experience in the application of top-dressing to the green crop break; but would remark, that for potatoes, beans, turnips, &c., the manure necessary can always be applied with most profit when the seed is sown.

In conclusion, permit me to observe and I make known not only my own experience, but that of every other agriculturist who follows farming as a profession—that the natural character of the soil, its situation, and present condition (by which I mean rich or poor) are all elements that must either more or less affect the results obtained from given quantities of special manures, when used as top-dressings; and, indeed, I may say, these same elements influence every other operation in farming, and it would not be too much to charge with ignorance or presumption any tiller of the soil who would uphold his own experience on his own farm, as an undeviating rule for even his next neighbour. In short, I may say that the profession of a farmer may be fitly compared to that of a physician or surgeon; for in the one as well as in the other it is only by careful and faithfully-recorded observation as to his cases of success and failure that he can trust to what he can do when an emergency occurs. I would therefore respectfully suggest that every one should for himself test the effect of special manures, termed, as they may well be, the concomitants to profitable cultivation.

Mr. G. **Hope**, of Fenton Barns, said—The experiments which I am about to detail were undertaken at the request of the Highland Society, as expressed through Mr. Hall Maxwell and Professor Anderson. I readily undertook to bestow on them the necessary care and labour that the effects in East Lothian of the manures employed might be contrasted with their action elsewhere. The manures used were nitrate of soda, sulphate of ammonia, and Peruvian guano, and likewise a proportionate mixture of the three, while one-half of each lot was also dressed with common salt. I understand the quantities of the different manures were fixed in relation to the amount of nitrogen which chemists have ascertained them to possess, and without regard to their market value. It was considered that 1 cwt. of nitrate of soda was sufficient for top-dressing an imperial acre under ordinary circumstances, that is, where land was in fair condition. Nitrate of soda may therefore be taken as the base of the experiments, and as there is as much nitrogen in 87lbs. of sulphate of ammonia as in 1 cwt. of nitrate of soda, that quantity was fixed for the second; while for the same reason 137lbs. of Peruvian guano was taken as the third; and one-third part of each of these three manures, mixed together, was taken as the fourth. Besides these, to ascertain the effect of common salt, half of each lot was dressed at the rate of 1 cwt. per acre; and in each experiment a part was left without any dressing, the more distinctly to mark the effects of the manures. Before proceeding further, I would remark that there is no subject connected with farming, uncertain as the effects of many of our operations are, which at all approaches this question of top-dressing in the variety of results which have been obtained by practical men. I would therefore beg it to be distinctly understood, that though I relate these experiments, they must not be taken for more than simple facts, which occurred in these particular cases; and though I will at the same time take the opportunity of stating to you frankly my opinions on top-dressing and consequent practice, still this is the last subject on which I would venture to dogmatise. The quality and the condition of soils are so various, and the weather also exercises such a powerful influence, both when the manures are applied and subsequently, that I am afraid it will still require a long course of well-conducted experiments before each individual farmer can be relieved from the responsibility of testing by experiment for himself the manures most suitable for his soil, and the best period for their application. The first experiment, then, was on young grass for hay; and here I found it most difficult to select ground of equal quality similarly planted. I ultimately fixed on a piece of very stiff loam, on a clay subsoil, which had been sown down with spring wheat after potatoes. It was, unfortunately, very indifferently planted, arising from the previous wet autumn having prevented the ploughing up and sowing of the field with winter wheat. There was very little red clover, and the rye-grass also was thin. The quantity of yellow clover was fair, while the white only was abundant. However, one part was not better than another, and the soil was of equal quality throughout. The different lots were carefully measured off, and straw ropes were laid along the ground to mark the divisions accurately. The manures were sown on the 11th of April, 1854; previously the drought had been severe, and very little rain fell for a long time afterwards; still the portions manured soon showed a much darker green than where it was not top-dressed. For a considerable time at first the portion to which the nitrate had been applied appeared most luxuriant, and to the end it retained a slight apparent superiority; but with this exception it was difficult to say by the eye which of the manures had operated best, though the part that had nothing was easily seen to be inferior. The lots were all mown in one day, and afterwards put into ricks at the same time. On the 24th of July they were all fit for being put into the stack, and when carted and weighed the result was as follows:—

MANURES APPLIED.	Weights per imp. half acre.			Weight per imp. acre.			
	cwt.	qr.	lb.	Ton	cwt.	qr.	lb.
Nothing				1	5	0	0
56lbs. nitrate of soda, and 56lbs. salt	18	3	0	1	17	2	0
56lbs. nitrate of soda	18	3	0				
43½lbs. sulphate of ammonia and 56lbs. salt	16	2	15	1	12	2	16
43½lbs. sulphate of ammonia	16	0	1				
68½lbs. Peruvian guano and 56lbs. salt	18	3	9	1	14	3	9
68½lbs. Peruvian guano	16	0	0				
18½lbs. nitrate of soda, 14½lbs. sulphate of ammonia, 23lbs. Peruvian guano, and 56lbs. salt	17	3	14	1	14	3	21
18½lbs. nitrate of soda, 14½lbs. sulphate of ammonia, and 23lbs. Peruvian guano	17	0	7				

It is evident the crop is a very small one; but simply viewing them as acre lots differently dressed, it will be found by taking the present market value of the manures, that the increased crops from nitrate of soda and Peruvian guano cost about 4d. per stone of 22lbs., and from sulphate of ammonia under 5d. It appears to me singular that salt should have had such a decided effect in increasing the produce of three out of the four lots, while with nitrate of soda it does not seem to have had any effect whatever; and the increase with Peruvian guano is so large, that I am inclined to suspect some accidental cause may have contributed to the difference. I did not attempt to ascertain the weight of the second crop, having been compelled to pasture the field with sheep. I may state that for some years past I have been in the habit of top-dressing the whole of my grass, partly with guano and partly with nitrate of soda. I am satisfied it has sometimes paid me handsomely; but at other times I have been doubtful of it, particularly when the weather proved dry after the manures were applied. If guano is applied early in the season, say in February, I have always found the increased crop of hay sufficient to pay at least the expense; but when delayed until the end of March or April, the chances are it will either pay a great deal better or that it will not pay at all: in fact, its success depends on whether it receives an immediate and copious supply of moisture. On the other hand, nitrate of soda should never be sown until vegetation has fairly commenced; and then when circumstances prove favourable, its effects, particularly on rye-grass, are often marvellous. For cutting grass I prefer a mixture of guano and nitrate, or nitrate alone; while for pasture, guano is probably best, unless there is abundance of rye-grass. Perhaps I should mention that I have usually a large flock of ewes with early lambs, and that a good bite at the first of the season is of the utmost importance to them; and this to a certain extent may influence my judgment, when I allege that top-dressing pasture grass can be done with a profit. This, however, does not apply to grass for cutting green or for hay, which to pay must be taken when ripe, and not allowed to remain until the undressed portion also begins to decay, as the rye-grass of the first will cease to spring, to the serious loss of the second crop.

The second experiment was in top-dressing wheat. It was the Fenton variety sown after potatoes to which 4 cwt. of Peruvian guano had been applied to the imperial acre; besides, half of the previous crop, which was Swedish turnip, was eaten on the ground with sheep. The soil may be described as an excellent loam of uniform quality lying on trap rock. The same care as in the hay crop was taken to mark off the different lots, and to keep them distinct. The manures were applied on the 12th of April, and immediatety harrowed in with the grass seeds. Though I have again to regret the extreme dryness of the atmosphere, yet by-and-bye the effects of the manures became apparent, but never very strikingly so. Strangers could always detect the portion undressed; yet variations of opinion were common as to which was the most luxuriant of the manured pieces. For myself, I thought the nitrate of soda generally exhibited rather the greatest appearance of growth. There was no perceptible difference betwixt the lots in the time of ripening. The whole were cut on the 21st of August. I thought at that time that the straw of the portions which got salt was rather paler in the colour than where it got none; and also, that where the sulphate of ammonia had been applied, the grain was most distinctly seen shining out betwixt the chaff. The young clovers on the stubble were then equally well planted, and they continue to be so. On the 4th of September each half acre was put into a rick by itself, and immediately thatched to defend it from rain. The thrashing took place on the 7th of October; and the following table exhibits the produce in grain and straw of each half imperial acre, and also the weight per bushel of the different lots:—

MANURES APPLIED.	Produce per ½ imp. acre.		Weight per bush.	Weight of light grain.		Weight of strawandchaff.
	bush.	peck.	lbs.	st.	lbs.	stone of 14lbs.
Nothing	19	3	63¼	4	10	157
56lbs. nitrate of soda and 56lbs. salt . . .	21	1	63½	1	11	160
56lbs. nitrate of soda	20	3	63½	3	2	167
43½lbs. sulphate of ammonia and 56lbs. salt . .	22	1¼	63½	4	0	178
43½lbs. sulphate of ammonia	22	0	63½	3	11	160 6lb.
68½lbs. Peruvian guano and 56lbs. salt . . .	21	0	63	3	2	161
68½lbs. Peruvian guano	21	2	63¼	3	4	167
18½lbs. nitrate of soda, 14½lbs. sulphate of ammonia, 23lbs. Peruvian guano, and 56lbs. salt . .	23	0	63	2	4	156 11lb.
18½lbs. nitrate of soda, 14½lbs. sulphate of ammonia, and 23lbs. Peruvian guano	19	3	63½	5	2	157

So many things may accidently contribute to vitiate the results of experiments such us these, that I am not inclined to draw any very positive conclusions from them. But I was much struck with the number of half-formed grains which almost exclusively formed the light grain of what was not top-dressed; and altogether the sample was inferior, particularly when it was contrasted with the superior sample where the sulphate of ammonia had been applied. But besides being the finest quality, in this instance the sulphate of ammonia (and salt) also produced the largest yield, and from the fact of another wheat field after potatoes also dressed with sulphate and salt, but rather more heavily, having turned out my best and finest crop, I have been induced this year to purchase sulphate of ammonia to top-dress the bulk of my potato wheat. I have done this with more confidence from the testimony which Mr. Scott, of Craiglockhart, has borne for years to the value of sulphate of ammonia, for increasing both the quantity and quality of wheat. I have hitherto been accustomed to top-dress the greater part of my wheat crop with guano, and latterly partly with nitrate of soda and salt. Guano, I may say, has invariably paid me well by the increase of produce; but where liberally applied it is very apt to render the quality inferior. I have likewise a very high opinion of nitrate of soda, but the great difficulty with it is the proper time for sowing it; for, as I said regarding its application to grass, it does little or no good when applied previous to the spring growth, and then it requires a copious supply of moisture. I have not had sufficient experience with sulphate of ammonia to be able to say whether or not it requires the same caution to secure suitable weather for applying it to the crop. On many soils guano is found to be highly remunerative when applied to oats or barley after grass. It is generally harrowed in with the seed; but in several instances I have known it hoed in when the grain had sprung an inch or two above ground, and the crop was larger than where it had been harrowed in with the seed on the same field. As far as my own experience goes, I am quite satisfied that every description of grain crop will pay for top-dressing when applied at the proper season, unless there is reason to expect that the crop will be as strong as it can stand without it.

The next and last experiment with these manures was their application to potatoes. The ground selected was of uniform quality, being a fine free loam, well adapted for the growth of root crops. The previous crop was Swedish turnip, which had all been manured alike, and the whole crop was removed from the ground. It is right I should mention that for several reasons I resolved to make this trial on only half an imperial acre for each manure, and thus use salt to only a quarter of an acre or half of each lot. However, I have calculated the whole as if the same space of ground had been taken as in the former experiments. When the land had been ploughed and prepared for the crop, it was drawn into drills, and into which were put ten cart-loads per imperial acre of good farm-yard manure. On the 29th of April the artificial manures were sown above the seed, and covered in with it. The potatoes planted were the variety known as Regents. The braird was good, the stems being strong and regular. During summer the portion to which the nitrate of soda had been applied exhibited much more leaf and stem than any of the others; but in autumn they faded a week before the others showed any symptoms of decay. It could not be said that the portion without any artificial manure had much less shaw than where sulphate of ammonia and guano had been applied, but the leaves were frequently to be seen distinctly paler. The potatoes were lifted and weighed on the 16th of October. The following table exhibits the crop, showing the effects of the salt in half imperial acres, and the total crop per imperial acre, including the parts with salt and the parts without, after the different manures, the large marketable potatoes being in one column, and the diseased and small ones in another:—

Manures applied above 10 carts dung per Imp. acre.	Good Potatoes per ½ Imperial acre.				Small and diseased per ½ Imperial acre.				Large per Imperial acre.				Small and diseased per Imperial acre.			
	t.	c.	q.	lb.	t.	c.	q.	lb.	t.	c.	q.	lb.	t.	c.	q.	lb.
56 lbs. nitrate and 56 lbs. salt.	2	14	0	16	1	5	3	6	5	13	3	24	2	7	0	20
56 lbs. nitrate	2	19	3	8	1	1	1	14								
43½ sulphate ammonia and 56 lbs. salt.	3	0	0	8	0	18	3	8	5	19	2	22	1	13	1	12
43½ sulphate ammonia	2	19	2	14	0	14	2	4								
68½ lbs. Peruvian guano and 56 lbs. salt.	2	13	3	0	0	16	0	24	5	6	2	14	1	11	1	4
68½ lbs. Peruvian guano	2	12	3	14	0	15	0	8								
18½ lbs. nitrate and 56 lbs. salt, 14½ lbs. sulphate ammonia, and 23 lbs. guano.	2	18	0	0	0	13	0	0	5	11	2	0	1	6	0	22
18½ lbs. nitrate, 14½ lbs. sulphate ammonia, and 23 lbs. Peruvian guano	2	13	2	0	0	13	0	22								
None	2	12	1	6	0	15	1	2	5	4	2	12	1	10	2	4

The manures thus all acted more or less powerfully, but I will not attempt making any remarks on this table. Hitherto with a moderate quantity of farm-yard dung, guano to the extent of 4 or 5 cwt. per imperial acre has been after a grain crop my staple application for potatoes. In no case would I be disposed to give less than 3½ cwt. or much to exceed 5 cwt. It is not easy to hurt green crops generally with manure, but a heavy crop of potatoes is much more liable to disease than a lighter one. However, for top-dressing grain and grass, and still more so for potatoes, the quantities of manures used, in the experiments I have related, appear to me now decidedly small, and the only inference I am disposed to deduce decidedly from them is the propriety of new trials, with the view further to elucidate the action of nitrate of soda and sulphate of ammonia. I am disposed to repeat the experiments on wheat and potatoes, proportioning the manures more nearly to their market value, and applying for comparison perhaps 3 cwt. of guano to wheat, and 4 or 5 cwt. to potatoes. If half-a-dozen of the gentlemen present would undertake to make similar experiments, and return here this day twelvemonth, and give us an account of their success, I venture to say the pleasure they would derive in carrying out the experiments would amply compensate them for the trouble, while they would have the additional satisfaction of contributing to the general fund their quota of facts, on which sound science and practice are alike based.

Dr. ANDERSON said—Before remarking on the interesting results of the experiments which Messrs. Finnie and Hope have now communicated to the society, I may be permitted to state shortly the circumstances in which they originated. It is scarcely necessary to say that the use of nitrate of soda as a top-dressing for grain crops, which though it had never become general, had long been successfully employed by a few individuals, has recently been brought very prominently before the agricultural public, and its great superiority over all other top-dressings, and particularly over Peruvian guano, strongly urged upon the farmer. It was especially represented that the quantity of grain produced by an extremely small quantity of nitrate of soda so greatly exceeded that obtained by guano, that its use in this way might be considered as tantamount to the discovery of a manure equal to Peruvian guano, at half its cost. That is to say, that the expenditure of a given sum in nitrate of soda would produce twice as large a return as it would in Peruvian guano. In my address on the Recent Progress of Scientific Agriculture, read at the concluding monthly meeting last year, I ventured to question the accuracy of this conclusion, and remarked that while it was in accordance with the results of Mr. Pusey's own experiments, those of other experimenters by no means agreed with them. Indeed, the experiments of Kuhlman led to a directly opposite result, for he found the effect produced by guano greatly to exceed that of nitrate of soda. He took quantities of these manures containing the same amount of nitrogen, and found that the total effect produced by guano is much larger than by nitrate of soda. I quoted these experiments not with the view of maintaining an opinion opposed to that of Mr. Pusey, but for the purpose of pointing out that the question must still be considered as undecided, and stated it as my opinion that the results of neither experiments were to be implicitly relied on, but that the most probable and reasonable view was, that the same quantity of nitrogen, whether in the state of nitrate of soda, ammonia, or guano, must always produce the same effect, provided the conditions of the experiments in each case were favourable to the particular form of nitrogenous compound employed. In fact, I held that the subject was open for further inquiry, and suggested it as one of those points to which the attention of experimenters might profitably be directed, and especially urged the necessity for accumulating a sufficient number of experiments to admit of just conclusions. It was with great satisfaction, therefore, that I learned that the Highland Society had requested Messrs. Finnie, Hope, and Russell, to make their series of parallel experiments with the same manures. After some correspondence with these gentlemen, it was resolved that nitrate of soda should be employed at the rate of 1 cwt. per acre, and that sulphate of ammonia and Peruvian guano should be used in such quantities as to supply the same amount of nitrogen. It was further resolved, that a mixture of these manures should also be used. One other point seemed worthy of inquiry. It has recently been customary to mix nitrate of soda with common salt, which is said to strengthen the straw, and prevent the tendency to lodge which is frequently observed where light manures have been applied to grain; but as doubts have been expressed on this point, it was thought well that these manures should be tried both with and without salt. The results of these experiments Mr. Finnie and Mr. Hope have this day communicated to us. Owing to Mr. Russell's absence from this country during the greater part of last year, his experiments have been conducted by Mr. George Russell, Hatton; but through some misunderstanding they have not been made in exactly the same manner as those of Messrs. Finnie and Hope; and though this is in some respects a matter of regret, they are still interesting, as they lead in almost all respects to conclusions similar to those deducible from the other experiments.

In discussing the results arrived at, I may in the first place refer to the effect of the salt employed upon one-half of all the experiments; and looking to the results as a whole, I think it may be safely concluded that it is without effect, or at least that its influence is very uncertain. Thus, we find in Mr. Finnie's wheat experiments that nitrate of soda alone produces, of good and light grain together, 5 quarters 3 bushels 47 lbs., and when mixed with salt 5 quarters 5 bushels 15 lbs.; and making allowance for the fact that the former somewhat exceeded the latter in weight, we see that the difference is trifling. On the other hand, we see that the addition of salt has been rather injurious to sulphate of ammonia and guano. Mr. Hope's results are in the same direction; he finds a slight increase from the addition of salt to nitrate of soda, while with the others it is without effect. On grass again, Mr. Hope finds that the yield from the nitrate is exactly the same whether it be used with or without salt, while the quantity obtained from sulphate of ammonia and guano is slightly increased. Mr. Finnie's results are completely in accordance, while Mr. Russell states that no effect was produced by the salt in any case. Of the three experimenters Mr. Hope is the only one who has used salt upon the potato crop, and with it his results completely correspond with those just stated, for he finds that its addition materially decreases the yield from nitrate of soda, and slightly increases it from the others. We may therefore safely say that the results obtained from the addition of salt to these top-dressings is entirely negative, as far as amount of produce is concerned. I must observe, however, that in some cases salt acts in a beneficial manner, as it apparently adds to the strength of the straw, and, by preventing that tendency to lodge which is frequently observed when light manures are employed on newly reclaimed land, insures a better crop than can be obtained without it. On well cultivated soils such as those in which the present experiments were made it seems quite unimportant, and may therefore be dismissed without further comment.

We have, then, simply to consider the relative effects of the different nitrogenous manures, and as the salt has had no effect, we may consider those in which it has been used in the light of duplicates of the others. The experiments having been made on a grain, a grass, and a root crop, we must consider the individual effects produced by each.

Wheat.—In Mr. Finnie's experiments there is remarkable similarity throughout the results, which, however, is not immediately apparent, as his tables are constructed; but if we add together the quantities of good and weak grain, and further, take the mean of each pair of experiments, with and without salt, we have the following table—

Nitrate of soda	5	5	47	5	4	30
„ with salt ..	5	5	14			
Sulphate of ammonia ..	5	4	56	5	3	29
„ with salt ..	5	2	14			
Peruvian guano	5	6	30	5	4	60
„ with salt ..	5	2	60			
Mixture	5	5	37	5	4	16
„ with salt	6	2	52			

We perceive at once that guano has given the largest return; next to it comes the mixture; and third only is nitrate of soda, *with salt.* The second column, giving the average of each pair, shows that, though Peruvian guano stands highest, nitrate of soda is little behind it, while sulphate of ammonia falls short by more than a bushel. This difference is so small, however, as to be unimportant.

Turning to Mr. Hope's experiments we find the results somewhat different; for, with him, sulphate of ammonia has given the highest result, while guano and nitrate of soda are nearly on a level. In Mr. Hope's experiments, we have the advantage of being able to compare the produce with that of an unmanured portion, from which we are enable to calculate the actual profit derived from each manure. I shall select the highest result afforded by each manure, which is most favourable to nitrate of soda, and we obtain the following table, wheat being taken at 70s. per qr.

	Increase per acre.	Increased value of crop			Cost of manure.			Profit.		
	bushels.	£	s.	d.	£	s.	d.	£	s.	d.
Nitrate of soda and salt	3	1	6	0	1	0	0	0	6	0
Sulp. of ammonia and salt	5	2	3	9	0	13	6	1	10	9
Peruvian guano ..	3½	1	10	0	0	14	0	0	16	9

It follows, therefore, that while sulphate of ammonia has given a profit of 30s. per acre, nitrate of soda has given only 6s., and nitrate of soda employed alone gave an increase of only 2 bushels per acre, value 17s. 6d., entailing a loss of 2s. 6d. per acre.

In Mr. Russell's experiments, where the produce of wheat from the unmanured portion is very small, being only 3 qrs. 3 bush. per acre, the effect of the top-dressings is more marked than either in Mr. Finnie's or Mr. Hope's, and in them guano holds the highest place, while nitrate of soda stands low. It gives a profit (calculated on the same manner as before, but taking the wheat at the value of 72s. as given by Mr. Russell) of but 7s. 9d. per acre; while sulphate of ammonia gives £2 9s., and guano £3 7s. per acre. As far as the production of straw is concerned, Mr. Finnie's results are most favourable to nitrate of soda, Mr. Hope's to sulphate of ammonia.

Grass.—Turning to the hay experiments, we find matters more favourable to nitrate of soda. Mr. Hope finds that it produces on the average an increase of 12 cwt. per acre, while guano only gives 9 cwt., and sulphate of ammonia 7·cwt. It is worthy of remark, however, that guano conjoined with salt gave a higher result than nitrate of soda, but when employed alone its effects were greatly inferior, and hence the difference in the average. Mr. Finnie's increase is 17 cwt. from nitrate of soda, 14 from sulphate of ammonia, and only 10 from Peruvian guano. Here guano falls decidedly short of the other ones; while taking into account the relative costs of the two manures, the nitrate and sulphate of ammonia leave about the same profit.

Mr. Finnie has calculated the money value of the hay crop at 7d. per stone; and it thus appears that the portion dressed with nitrate of soda alone, gives an increased value of £1 8s. 7d.; but when common salt was added, it was only £1 4s. 4d. Taking the average of the two, we have £2 4s. 1½d. as the profit; which considerably exceeds that of the other manures. Mr. Hope's experiments afford similar results. With nitrate of soda, the profit is £1 18s. 8d. per acre; with sulphate of ammonia, £1 2s. 2d.; and with Peruvian guano, £1 11s. 10d. In Mr. Russell's experiments guano gives an increased amount of hay, the value of which, deducting the cost of the manure, is 12s. 10d.; nitrate of soda gives £1 0s. 8d. profit; and sulphate of ammonia, £1 7s. 2d. On grass the results are on the whole more favourable to nitrate of soda, but they by no means give it that pre-eminence which has been lately assigned to it.

Potatoes.—The results obtained from potatoes are unfavourable to nitrate of soda, but considerable discrepancy exists between Mr. Hope and Mr. Finnie's results. Calculating Mr. Hope's at the rate of 3s. per cwt., I find that, after deducting the cost of the manure, the profit is 10s. per acre, while sulphate of ammonia gives £1 8s. 6d., and Peruvian guano entails a loss of 7s. In Mr. Finnie's experiments, sulphate of ammonia gives a loss of 14s. per acre, nitrate of soda a gain of 19s., and guano a gain of £3 11s.

Taking these experiments as a whole, I think it is obvious that they form a very important contribution to our knowledge of these manures when used as top-dressings upon different crops; but they indicate also in a very forcible manner what I have frequently remarked, and what cannot be too often asserted, namely, that we must not rely too implicitly on the results of one, or of a few experiments. We see, in fact, that had we founded our arguments entirely on one of these sets of experiments; our inferences as to details would have differed to some extent, although the general conclusions would have been substantially the same. I am far from asserting that these experiments can be considered as exhausting the subject, or that we are entitled to assert that in all cases similar results are to be obtained; but this much is clear, that the extraordinary pre-eminence assigned to nitrate of soda is far from being borne out. It is to be observed, however, that the season was dry, and on that account comparatively unfavourable to top-dressings. This circumstance would undoubtedly act prejudicially on all these manures, but less so on nitrate of soda than the others. We know that when sulphate of ammonia and guano lie for a considerable time on the surface before they are washed in by the rain, a material loss of their ammonia occurs. On chemical grounds we know that such loss is less likely to occur with nitrate of soda; and I believe it has been ascertained that in practice this is actually the case. We remark, also, that the greatest effect in many cases has been produced by sulphate of ammonia; while guano occasionally stands behind the other two. It must be remembered, however, that the experiments are incomplete, and that the effects upon the next crop may materially alter the relative position. Kuhlman found that guano differed from nitrate of soda and purely ammoniacal manures in the action which it exerted in the subsequent crops. He found that it produced a marked increase upon them, while the portions which had been dressed with nitrate of soda and sulphate of ammonia actually gave in the subsequent year a less produce than the unmanured portion. Should a similar result be obtained on the crops of this year, we shall at once see that our conclusions may undergo considerable modification, and that guano may come to stand higher than it at present does. Meanwhile, while these manures are taken so as to supply the same quantity of nitrogen, we have evidence that there is no marked difference between them, unless it be the hay crop. Then we find that nitrate of soda does undoubtedly produce a larger increase than either of the others; and this is in accordance with the observation frequently made of its superior effects on the gramineæ. In other words, it produces a more powerful effect on the stems than the other manures; and this we see also in the wheat, when a larger increase of straw is produced by it than by either of the other manures. But in the production of seed we observe that the advantage lies in some cases with sulphate of ammonia, in others with guano; while nitrate of soda is invariably inferior.

Such are the results of their experiments; and, though I consider them most important, I am far from thinking that they completely settle the question of their comparative values. We must still extend our knowledge, and I know no method in which practical farmers could do more service to their art than by carefully estimating the produce obtained from these manures. Now that we may be considered as having got rid of the salt question, all that is necessary is to employ those manures in the proportions indicated in these experiments; and as most farmers have occasion to use one or other of these manures as top-dressings, they could without much trouble have an unmanured plot, and, weighing the produce, these results would be of importance both to the agricultural community at large and to themselves.

I believe, indeed, that while we may deduce the effects to be generally expected from each manure, there are innumerable circumstances by which they are liable to be influenced in particular cases; so that it may easily happen that on particular farms, or even districts, peculiarities of soil, climate, or exposure, may give a decided superiority to one particular manure; and for this reason it cannot be too strongly urged upon the farmers that each must by actual experiment ascertain for himself the special effect of each manure on his own farm. Were this done to any extent, and the results properly compared with each other, we should arrive at far more satisfactory and valuable conclusions than it is possible to obtain from a few experiments, however carefully performed.

These observations have extended to so great a length that I shall only further occupy the time of the society with a few remarks upon the general question of top-dressing. It must be obvious that all top-dressings are open to the objection that they are dependent upon the fall of rain for their mixture with the soil; and if this does not soon occur, and the substances lie exposed on the surface to the sun's rays, greater or less loss must occur. On the other hand, they afford the means of bringing a supply of manure to the plants just at the time at which it may be required, and under the circumstances in which it may be most advantageously absorbed. In fact, theoretically—that is to say, provided we could secure the most advantageous conditions of temperature, moisture, &c.—it seems unquestionable that the manures we employ could be best used by applying them at the time that vegetation becomes active, and the plant can most rapidly avail itself of them. In practice, however, we cannot insure the occurrence of these conditions just as we require them; and hence a top-dressing becomes liable to all the uncertainties of the other manures. If immediately after its application it is carried into the soil by rain, good and well; but even if it lies unchanged upon the surface, the period of its most favourable influence may have passed before it comes in contact with the roots. Under any circumstance, it is clear that the greatest immediate effect must be expected from a substance which is readily soluble in water; and hence we should anticipate that if a given weight of nitrogen be applied in different forms we should expect nitrate of soda or sulphate of ammonia to surpass guano at first, while in the long run matters should be reversed, and, taking the effect on successive crops, that the total produce of the last should be largest.

I am strongly of opinion, however, that, as a general rule, top-dressings are to be considered very much in the light of a means of succouring a crop which is likely to fail rather than as a mode of permanently producing good effects. In the former point of view they are most important adjuvants, but they are never to be compared with that system of cultivation which keeps the land in thoroughly good heart by the free use of these manures, whether farm-yard or light manures, which are applied in the usual way.

After some remarks by Sir W. Gibson Craig and Mr. Hall Maxwell upon the great importance of similar experiments being conducted in various parts of the country, Dr. Anderson stated that he would be most happy to render any assistance to gentlemen undertaking such investigations, and at the request of the meeting agreed to prepare instructions for their uniform conduct.

A vote of thanks was accorded to the noble chairman.—North British Agriculturist.

THE SALE OF LAND IN IRELAND.

In the course of a tour which we made in Ireland, during the past summer, we had the gratification of hearing the performance of what, we fear, must be called the "Lay of the Last Minstrel." A blind harper, one of a race now nearly extinct, was perambulating the country, partaking of the hospitalities of the steward's room in castle and hall, and performing in the drawing-room of an evening, before knights and ladies. He gave a public concert at the inn at which we had our head quarters, and we had the pleasure of attending it. He played and sang some of Moore's Irish Melodies, some of the rollicking slang songs of Ireland, and some songs in the vernacular Irish. He recited stories from Crofton, Croker, Lover, and other writers. Among these was one which was probably derived from one of these authors, though we did not remember it. It described an Englishman in Ireland, looking out for an investment in lands to be sold in the Encumbered Estates Court, who had taken for his guide a peasant of the genuine old school. The Englishman is, of course, anxious to ascertain the value of landlord life in that part of Ireland, by a series of questions which he puts to his guide. It is impossible to do justice to the dialogue, unaccompanied by the peculiar whining and drawling pronunciation which in Ireland is supposed to constitute the English accent. Something like the following dialogue, however, takes place:—"What is your name?" "Denis O'Toole, your honour." "I suppose you know this part of the country well?" "Divel a one should know it better, your honour, seeing I have lived here man and boy nearly forty years." "Eh, ah! you have lived here forty years, have you? I suppose it is a pretty healthy country; and whose is that white house on the hill yonder?" "Mr. O'Flannigan's, your honour." "Oh, Mr. O'Flannigan's, is it? and how long has he lived there?" "He does not live there at all, your honour; because he is dead entirely." "Dead entirely," repeats the Englishman, with a peculiar emphasis on the *entirely;* "and, pray, how long has he been dead?" "I cannot say, your honour, exactly how long he has been dead; but if he had lived till next Martinmas, he would have been dead two years." This system of computing time, of course, puzzles and astonishes the Englishman not a little. He follows up his cross examination by the "momentous question" what he died of, and receives for answer, "that of all the days in the week, he died of a Thursday."

With this anecdote we introduce the subject of the sale of land in the Encumbered Estates Court, and the prospect which it holds out of investment to English capitalists. Who has forgotten the cry with which the whole country re-echoed, when the measure was introduced by a Whig Administration, on the suggestion of Sir Robert Peel, as a substitute for the millions upon millions which were being poured into the bottomless abyss of Irish destitution? Robbery, spoliation, and confiscation were the mildest terms bestowed upon it. The tables are turned now; and the Encumbered Estates Court is a great favourite with Irish proprietors. The term for which it was originally passed has expired. It has been renewed for a further limited period; and the Court is so choked up with petitions, that it is considered impossible to dispose of them all in the time. The landlords themselves are thronging it as petitioners, in order to free their estates from encumbrances, by the sale of a portion of them. The only persons who have any reason to complain of it are the lawyers, to whom it has proved "a heavy blow, and a great discouragement." A large portion of the business of the Four Courts related to encumbered estates—estates involved in interminable suits in law and in equity. The fertile soil of the Green Island was in nothing more fertile than in an exuberant growth of encumbrances—of settlements which, like the "Connaught lady's fortune, were so well secured that they could not be got at." The old race of Squire Rackrents is fast disappearing; a new race of landowners is springing up. Property to the extent of millions has been sold, and there has been no lack of Irish capital to purchase it. Many tradesmen, who have realized property, have become able to transfer their savings from the Funds to land in their own country, where some sects, during the rigour of the penal laws, were prohibited from acquiring land, and where, since the removal of those laws, they were unable to acquire land because there was none in the market. The nominal owners were acting only as trustees in perpetuity, for the benefit of Irish barristers and attorneys. The gentlemen of the long robe have a great dislike to a Parliamentary title, which may be contained in a cash box. Some people are even beginning to think that an Encumbered Estates Court might not, after all, be such an intolerable evil even in England. A new conservative element has been introduced into Ireland, and a new stimulus has been given to commercial industry. The descendants of the O's and Macs, whose estates were confiscated under Elizabeth and Cromwell, have now an opportunity of regaining, by purchase, the lands which perhaps they sometimes dreamed of regaining by more violent means. The market value of land is rising in Ireland, though it is still below the English standard. We have even heard it declared, by the agent to a large Irish proprietor, who belongs to that rare class possessed of ready money, and who is desirous of extending his influence in the country, by increasing the number of his broad acres, that the market value of estates in Ireland has risen so much, that investments in land are out of the question. In cases which have fallen under our own knowledge, such proprietors have been bidders in the Encumbered Estates Court, and have been outbid, for small properties, by the successful shopkeepers and professional men of the neighbourhood. The market value of land, however, is still below that of England, and the letting value, notwithstanding all we hear in England of exorbitant Irish rents, would not in general be high if the land were properly cultivated.

In illustration of these views, we will cite a case, which came lately under our own knowledge, of a small estate sold in the Encumbered Estates Court, in a county which an Englishman, who has had much experience in Ireland, assured us he had often traversed in security, at midnight, unarmed, nearly ten years ago, when it bore a much worse character for agrarian outrage than it bears at present—agrarian outrage is, in fact, scarcely known there. The property was sold to pay off the incumbrances on a larger estate. It contained 111 statute acres, was let for £94. The deductions to which this rental is liable are the tithe rent-charge, and the half of the poor rates, which, in Ireland, are paid by the tenant, but recoverable by him from the landlord. The tithe rent-charge amounts to £2 5s.; and the landlord's half of the poor rate averages £3, making, in all, £5 5s., and leaving a net rental of £88 15s., or nearly 16s. an acre. The tenants, among whom the new landlord is very popular, and who were delighted at his becoming the purchaser, immediately agreed to give an advanced rent of £133, or fully 23s. an acre, after making the preceding deductions. The property, therefore, which was purchased for £2445, sold for rather more than 27½ years' purchase on the old *net* rental, and 19 years' purchase on the new rental. The soil is a strong loam, resting upon boulder clay, which is based upon limestone. Very little of it requires draining, and most of the land on which draining is necessary possesses a good outfall. Some of the land is under tillage, with a large portion under permanent pasture.

It must be borne in mind, however, that the property is divided into farms of about six acres each, which, in Ireland, is called a well-circumstanced estate. If this, or a similar property of thrice the area, had been purchased by a farmer from England or Scotland, for the purpose of occupation, it would have been necessary for him to eject these tenants, or to purchase their interest. We presume he would have preferred the latter alternative. It would also be necessary to erect a residence and homestead, for the present farm houses are only fit for labourers' cottages. These are two very important additions, which must be taken into consideration in estimating the value of Irish estates, as compared with those of England and Scotland.

LAND IMPROVEMENT MONOPOLY.

Under this title we propose considering how far tenant-right, or the general reformation of our land laws, as demanded by the mutual interest of landlord and tenant, can be superseded by the private acts of land improvement companies. Numerous companies, as our readers are aware, have lately obtained acts of parliament, enabling them to invest capital in permanent improvements, and effect preferable security for the investment. Can landlords and tenants, through their instrumentality, permanently improve their estates and farms with as much success as they could do under properly revised territorial statutes?

That the private statutes to which we refer are less objectionable than the antiquated public ones, will readily be granted; but that they are calculated to supersede "tenant-right" is a very different question. Hitherto, landlords have been too much disposed to entrust the entire management of their estates to agency, and those brought up in office or looking forward to such may naturally conclude that landed property cannot be burdened by too much machinery of this kind; but those who are otherwise situated, and who comprehend the capabilities of land, the different interests involved, and the general progress of things at present, will readily perceive that the management of land, like the management of our army and navy, is subject to improvement, and that a more practical organization from the highest to the lowest is absolutely necessary, to secure successful husbandry. In other words, landlords must learn the golden rule, that "to do well, the master must be at the head of his own affairs."

In proof of this, we have only to notice the fact that landlords, as a body, are daily becoming more practical, and tenants scientific, and that where both have become masters of the science and practice of agriculture, agency and all sorts of intermediate jobbing are fast disappearing. This is only what the universal testimony of experience recommends, and what every friend to rural prosperity must wish to see in general operation.

In harmony with this reformation on the part of themselves, landlords and tenants are also daily becoming more convinced of the necessity of their sons and successors paying a still greater deference to the science and practice of agriculture. The former, for instance, are beginning to feel that the army and navy is not the proper school for heirs-apparent learning to manage the patrimonial inheritance, or represent its interest in Parliament. Doubtless the times were when the opposite was true; but old systems, like old landlords, must die out, and be replaced by new, leaving heirs-apparent the alternative of keeping pace with the progress of things. The latter, again, are also beginning to experience that an apprenticeship at the plough is no longer sufficient to make successful farmers of their sons; nor their allowing them to follow the hounds the practical course of forming an acquaintance with their landlords, so as to secure farms. The tide of improvement is of necessity rolling on, sweeping before it machinery of this kind; while the rising generation are of themselves beginning to think of more rational systems.

In making these observations, we are aware how strongly many yet ridicule the idea of our large landed proprietors, or their sons, ever being scientifically and practically qualified to superintend the improvement of their estates—*i. e.*, the management of their own affairs (?) On the contrary, how many are there, who affirm that "the less they know of practice, so much the better for their agents and tenantry;" and who with equal confidence assert that a naval or military life is more honourable for the younger members of the family* than one spent in the permanent improvement of their country, or the reclaiming of her colonies for her surplus population! But a little inquiry into the facts of the case satisfactorily accounts for erroneous conclusions of this kind.

From the emphasis generally put upon that part of the objection involved in *honourable employment*, it requires special refutation. For example: Russia is much more military than England. Is she therefore more honourably employed? In point of fact, England is the least military of all the kingdoms of the world, and the most disposed to peace. Is she the less honourable on that account? Is war more honourable than peace? the gory trenches at Sebastopol than the permanent improvement of the British soil? Is England herself less honourably employed in the nineteenth century than she was in the fourteenth? In short, as we progress in civilization we are losing a taste for the barbarous pursuits of war. During the era of the great barons, our manufacturing and commercial populations were looked down upon as pedling communities, and agriculture herself as the commissariat of the army; but since then public opinion has undergone an entire revolution, placing that which was last first, and the first last—elevating agriculture, manufactures, and commerce to the respective positions which they are entitled to occupy by virtue of their employments, and lowering the army and navy to the rank of a public executioner. There is no denying of these facts, nor the influence they are exercising on the public mind of Europe. The progress of things is irresistible; and if England is less military than Russia, it is because she has first begun to beat her baronial sword into a ploughshare, and is preparing to defend herself and allies by nobler means than the brute force of her subjects.

There cannot be a doubt therefore, from these facts, that the landed interest of this country is preparing to occupy a more prominent place in its industrial fabric than it has hitherto done. To deny this—advocating systems which can only have a temporary existence—is to lose sight of the leading characteristics of the present age in every rank of life.

We have thus glanced at one side of the picture; let us now turn to the other—land improvement monopoly. In this case it will be seen that private statute outwits public; while speculating companies are succeeding in taking from the landlord both his employment and daily bread, drowned acres and houseless farms are everywhere demanding draining and homesteads, while chemical and mechanical science is calling into existence improvements beyond number, in effect such as to produce an increase of upwards of 500 per cent. on the weight of crops—leaving interested parties no alternative but to join in the march of progress. How can they do better, so long as they are tied hand and foot by antiquated statutes? for although these companies may take the cream of the investment, yet the skimmed milk fifty years hence is better than nothing. On the other hand, England is threatening our military system with a thorough revisal, owing to our misfortunes in the Crimea; while private companies are, here again, actively proposing to contract for the levelling of Sebastopol, Cronstadt, &c.; and with a little more chemistry and mechanics, we see nothing to prevent their labours being crowned with success.

Commercial enterprise and capital, it will thus be seen, are beginning to set antiquated laws and systems of management at nought, both in landed and military affairs. True it is, that the Scottish Bar is frowning at its ancient statutes being thus invaded by the steam-engines, draining ploughs, and monopolies of England; but a little more capital will soon remove difficulties of this kind out of the way, while the Scottish soil will be left to pay for all!

No real friend of the agricultural interest can approve of such a state of things. We are not here to be understood as condemning the progress of military science, much less the conduct of land-improving companies, but the contrary; for we thank the latter for the generous spirit which has prompted them to so laudable an enterprise, for the immense good they are doing, the encouraging example they are giving, and for the profitable field they have thus opened up to the investment of surplus labour and capital. Long before the date of any of the statutes in question, we advocated the practicability of capital being invested in entailed lands by machinery of this kind, and of the extension of such to our colonies with still greater profit; so that it would be inconsistent on our part to lift our voice against it at present. Nevertheless, that is no reason why landlords and tenants themselves should not enjoy equal privileges with such companies to effect the improvement of their estates and farms. That the work legitimately belongs to them is universally admitted, and therefore why should antiquated statutes stand in the way of their doing so, preventing them not only from improving their property, but making at the same time provision for the younger members of their families, in accordance with the science of labour? Why, in the name of high-minded England, should a landlord, for example, who wishes to invest his capital at redeeming interest in the improvement of his estate, for the mutual benefit of the heir-apparent and his younger brothers, be called upon with demeaning subserviency to cringe at the footstool of any company for leave to do so, and not only thus to solicit leave, but submit to "blackmail" besides, while he himself is compelled to purchase post and pension for his sons on scarcely less ignoble terms!

The practical remedy for this unfortunate state of anarchy in British agriculture is free trade in the improvement of land—in other words, a thorough revisal of entail laws, leasehold and other land statutes, so as to secure to landlords and tenants their respective rights, enabling them to bring to bear upon the inexhaustible resources of the soil the greatest amount of labour, manure, and machinery which experimental science will justify. When our present statutes were framed, the industrial fabric of the country was in an entirely opposite state; for then, agriculture, manufactures, and commerce being subservient to its military and political machinery, acts of Parliament were consequently framed to provide for the interests of landlords and tenants accordingly; but now, this change having taken place, both the latter have become obedient to the supremacy of the former, while the laws of land remain unaltered. Hence the ruinous results experienced, landlords continuing to perform the principal duties of parliamentary and military life, without adequate remuneration or any of their former privileges; while commercial speculation by means of private statutes, is quietly setting antiquated public ones aside so far as serves her own purposes, with all the privileges they conferred. If this is all that the manufacturing and commercial interests of the country require, those of agriculture certainly demand something more.

A very important question arises as to the inadequate means which land-improving statutes possess for meeting the exigencies of tenants. No doubt, so far as the capital of the farmer is invested in permanent improvements, such as draining, provision is made; but this is not the legitimate province for his capital, for he often doubles and triples the productive value of his farm by labour, manure, and judicious cropping. A tenant, for instance, may invest, as we have done, £5 in lime, £5 in manure, and £5 in labour per acre, in land the fee-simple of which is not worth more than £20; so that, if he also invests £5 in draining, his total investment equals that of the landlord. For the latter sum of £5 provision is made by land-improvement monopoly statutes, but for the former £15 none! Is this justice to the tenant? In point of fact, it is not the administration of public justice which these statutes have in view, but private interests.

A hundred-and-fifty objections may doubtless soon be raised to every word we have said, and as quickly refuted. Companies it may be said, (1) form a more economical subdivision of labour, (2) an improved method of "raising the wind," (3) the advent of "peasant proprietorships;" (4) on the contrary, our proposition of "landlord and tenant right," it may be said, is a hopeless attempt to uphold an antiquated system which can never work well in practice, and so forth.

Now, *firstly*, the subdivision of labour belongs to the landlord and tenant, as is universally admitted; *secondly*, many landlords and tenants do not require to borrow money, while those who do so can get it on easier terms without those companies than with them, if antiquated restrictions were removed out of the way; *thirdly*, steam-draining ploughs, liquid-manure tanks, and culture generally by machinery, is fast exploding from the mind of every intelligent farmer the absurd doctrine of peasant proprietorships; while, *fourthly*, the improving condition of landlord and tenant is the best proof that the system is in a healthy state. These, and many other objections of a kindred character, are thus easily refuted.

The sum and substance of the whole matter just amount to this—that land improvement monopoly statutes are defective both in principle and practice. It has often been stated that the nearer practice attains to abstract principle, it is the more perfect. But in the case in question the one is opposed to the other; for a legal barrier stands in the way of landlords and tenants discharging their duty. That barrier Parliament refuses to remove from before them; but it has removed it from before a few private speculating companies. The latter are doing well—a proof that the former would do better, by the amount of "blackmail" they pay, were the barrier removed; hence the injustice they experience. This partiality on the part of Parliament arises from prejudice and misconception—or rather, perhaps, from a want of a practical knowledge of agriculture generally speaking. The monopoly is more against the tenant, for instance, than the landlord; as if the Legislature had contemplated that the former would keep the latter safe; but, if it has done so, disappointment will be the result, for tenants without *tenant-right* will just take out of the soil what improving companies put in, leaving their farms at the expiry of the redeeming term not worth more than the old rent! And who can blame them for so doing? Some landlords, to our knowledge, are already but too familiar with this counterbalancing practice; and when they, as a body, are able practically to comprehend how mutually their interests are united to those of their tenants, Parliament will legislate impartially, conferring upon both free trade in the improvement of land. The old plebeian maxim of "*every one having his own law*" will not suit this country, for land can no more be governed by private statute than commercial England.

THE BATH AND WEST OF ENGLAND AGRICULTURAL SOCIETY.

We confess that we have watched the resuscitation of the West of England Agricultural Society with much interest, and we may now add with proportionate satisfaction. It is not always that a revival holds out any great hopes of permanent success to those who attempt it. The very sense and knowledge of what is to be all done over again having once ended in little short of a failure may have more weight with many whose aid we have to seek, than they themselves might be at all inclined to allow.

It is at any time more easy to create than reestablish that feeling of general confidence without which no public institution can expect for long to flourish. It was with this difficulty the present promoters of the Bath Society have had to contend. They had to offer something as worthy of support and encouragement, where support had but too gradually died away. They had, in fact, in some measure to argue on a contradiction, and to prove a want which precedent went to show was but little wanted.

It is but fair to say that the western counties generally gave this effort their heartiest welcome. The opening meetings of this second era have been celebrated under the best auspices. The entries well filled, and the shows well attended, it became very manifest that with good guidance the undertaking could not but continue to prosper. It came at a very happy period, when from a stray visit or so of the great National Society the minds of men became the more ready to admit the need for such gatherings, and the advantages which must follow from them. In no part of the United Kingdom have we had more striking examples of improved agriculture than the West of England has furnished us within these very few years. To make this advance a general one, some general agent was required, and this has been very naturally sought for in the re-organization of the West of England Society.

Our readers must be tolerably well familiar with the proceedings, so far as they have yet been developed. We have made it our duty not merely to keep our attention on their reports, but to judge and report for ourselves. We have done this, as we ever hope to do, in the fairest spirit of criticism—ever willing to allow credit for all the good which has been accomplished, though not quite silent on what we felt might even yet be done better. This is at no time a grateful task. There are some of our friends we could name, who, indeed, are inclined to take it as a positive impertinence, and to cling yet the more closely to any defect, simply from having had it pointed out to them as a mistake. Like the Irishman's pig, to get them to go one way you must have them believe they are wanted to go the other. The West of England Society, we are glad to say, is open to no such charge. The few errors which marked their opening efforts have been, one after another, amended. Bath for management is better than Plymouth; and Tiverton promises to be still more on the improvement. The first number of the journal—too much an echo of other people's sayings and doings—merely heralds the way to a far more efficient representative in the second. Here the men of the west do speak for themselves; and now the *West of England Journal* is as much the journal of the West as that of the Royal Society is of England, or the Highland is of Scotland.

The third volume, just published, is now before us. Its contents, too, were advertised in our paper of last week; and a list of these alone will go far to show how becomingly it is conducted, as how directly it is made to serve those for whose especial benefit the Society was instituted. It would be, perhaps, too much to expect many lengthy papers in a journal of this character; and we believe the committee have experienced some want of competition for the prize subjects they have offered. But this is not a difficulty in the West alone; indeed, when we come to reflect, it is surprising to find the practical farmers of the kingdom addressing themselves so often as they do to composition of this kind, and then only with a chance of obtaining a hearing. Many a man would give a word or two in a letter that would never venture on an essay, and the experience of many a one might be thus obtained who otherwise would make no sign. After the reports on the exhibitions of the past year—machinery and stock both done justice to in the present number—we are inclined to look upon "The Farmers' Note Book" as one of the most valuable and useful features such a journal can have to depend on. The very opening note of "volume three" amply demonstrates this. It is appropriately on the management of apple-trees, and the writer, Mr. Belfield, commences his letter with a regret that the prize offered by the society for the best Essay on the Management of Orchards did not avail to elicit the information expected. From this he proceeds to "jot down his own notions and recent experiments,"—the very heart, after all, of agricultural literature—that many might be found to imitate, while comparatively few would attempt more. Mr. Belfield is already well supported; Mr. Prideaux, an old correspondent of our own, on Guano, Salt, and Ammonia; Mr. Robt. Smith, and Mr. Row of Tiverton, on Gorse for Cattle and Horses; Mr. Kemp, on Trefoil as a Spring Crop; Mr. Sandrey, on Spring Feed; Mr. Michelmore on Farm Labour, Mr. Trethewy on Keeping Young Stock—with many other topics, each disposed of in a page or two, but all going at once and keeping well to the point they are intended to impress or elucidate. It is here, we repeat, the editors will have their chief strength. Numbers of volunteers may be enlisted, ready to give their ideas in a note for the note-book, who would never join on any other conditions. More than this, too, many a subscriber will read and remember a short paper who will never look at a long one. At any rate, this *must* be the best means for encouraging either to undertake longer flights, and to bring more readers and writers to the West of England's journal.

We would not have it for a moment supposed that we wish to undervalue the more lengthy papers in this volume. There are some of especial excellence. The opening one, for instance, on the Exhibition of Implements at Bath—Mr. Whitley on the Climate of the South-west of England, and "the Chemistry of Practical Farming," by Mr. Thomas Dyke Acland. The Society owes much to Mr. Acland already in many ways. It owes him its especial thanks for this contribution, which goes far to remove that grand difficulty—the first advances or somewhat chilly introduction on which science and practice deign to greet each other. Some such master of the ceremonies has been long required, and, with Mr. Acland's permission, we may hereafter make him even more generally useful.

We hope to become still better friends with the West of England Society. It has ever been our wish to rank as such, and we are rejoiced to find that our one great cause of complaint is about to be removed. The Poultry Show at Tiverton *will* be part of the Agricultural Show, subject to but one charge of admission, and leaving the spectator that which he enjoys almost everywhere else—a full permission to turn and return from one department to another, at his pleasure. With a young Society it was perhaps a question of funds; it was nevertheless a mistake and a contradiction, and we congratulate the Committee on having "reformed it altogether."

SWEDISH TURNIPS.—The largest roots of the Swedish turnips are the most nutritious, affording in 64 drachms 110 grains of nutritive matter; while the middle-sized and smaller roots afford 99 grains. On the contrary, the middle-sized roots of the common turnips are the most nutritious. A root measuring 7 inches in diameter afforded 72¼ grains; while a bulb of 4 inches afforded 80 grains.

LONDON, OR CENTRAL FARMERS' CLUB.

THE MOST ECONOMICAL MODE OF CULTIVATING ROOT-CROPS.

The usual monthly meeting of this Club took place on Monday, April 2, at the Club-house, Blackfriars, Mr. B. P. Shearer, in the chair. The subject for discussion, introduced by Mr. W. Bennett, of Cambridge, was "The most Economical Mode of Cultivating Root-crops."

Mr. **Bennett**: Sir, in the days we live in, when our agriculture is making the most astonishing advancement, climbing, as Sir James Graham very aptly expresses it, "to the very hill top," it is scarcely necessary for me to say to the enlightened agriculturists I see before me, that with the judicious cultivation of the fallow crop, is immediately connected (I had almost said) all that is great and magnificent in agriculture, and that because it is the foundation on which rests the successful rotation of all the other crops. The fallows neglected, or only imperfectly done, the whole thing is a failure; and the farm throughout will never bear inspection. Whatever course of farming is adopted (and that man is a novice in agriculture who farms without a system), the fallows must be gone into with spirit, and with no niggardly or parsimonious hand; and I must be allowed to say, although some of our amateur agriculturists will tell you that fallows are unnecessary, I trow not, and, although I am no friend to needless restrictions, I hold landlords are justified in requiring that the farm shall systematically, either with or without a green crop, as is best adapted to the soil, receive a good and efficient fallow (cheers). Nor is it scarcely more to the interest of the landlord than the tenant (unless the latter is about to run away), that it should be so. Sir, I am free to confess, after an experience of some forty years—and, like other men, I have occasionally been naughty—but I say it advisedly, I have never stolen a crop in substitution for a fallow, without ultimately drinking damage. The fallow season is the starting post in the race. If the land requires draining, this is the time to effect it. If double ploughing or subsoiling, it must be done now. If crooked and unsightly hedges are to be reduced, there is no time more fitting for the operation than the winter preceding the fallow. Sir, in pursuing this discussion, it will perhaps comport with the convenience of the club, if we first attempt to show on what soils roots may or may not be profitably grown at all. I hope, by the bye, this statement will not shock any of my friends around me, because it is the opinion of some of our more modern agriculturists that turnips may and ought to be grown on all arable land. It is true there are but few soils on which you cannot cultivate turnips. But the question we have to discuss is—Can it be done economically, or will another system leave the land in a better state, and the farmer more money in his pocket? The farming world is by no means agreed on this point. There are those who will tell you that, only drain and plough deep, and you may then plant the land with turnips to advantage, irrespective of the nature of the soil, or its situation as regards the homestead. On the other hand, so much are we the creatures of habit, that I know there are farmers situate in the clay land districts, who year by year pursue the naked fallow system, without attempting anything better, even on the more favourable spots on the farm. The result of my experience, backed by close observation, leads me to believe both these practices are far enough from the correct one; but of the two, the man who recklessly drives at turnips over all his fallows, however unfit for such a mode of cultivation, will, sure enough, be quit of his money first! In fact, to pursue such a system upon the poorer dead tenacious clays of England is, in my judgment, the most rapid way to ruin a man can well pursue; and for this simple reason—the cost of production far exceeds their value in such situations, while the succeeding crops will show vast inferiority from those the land produces under a naked fallow, or where tares have been previously fed off with sheep. Close akin to such infatuation is that which induces the farmer of clay land to go through the whole of his farm, like a blind horse in a mill, with his naked fallows, because his father before him did the same, without looking round to see if there are not some portions of the farm contiguous to the homestall where a crop of mangold and wheat might be grown, perhaps alternately, to the great benefit of the farm, and sometimes other spots of newly broken up or woodland soil which, if not fit to depasture sheep in the winter, the crop might be extracted for the flock in the spring, with great advantage. In addition to the soils above named, as not generally adapted to the growth of turnips, we must add, however, a large tract of fen land, particularly in parts of Cambridgeshire, Norfolk, and Lincolnshire. It seems, however, it is not so much because the land will not bear turnips, or that there is difficulty in feeding them off, but that stock are not found to do well with them from such land. I am not at all sure, however, if this arises from an absolute inferiority of quality, or if it is not the soil attaching to the bulb, which mainly disagrees with the sheep; if so, washing the roots might obviate the evil. For the present, rape, mangold wurzel, and on the better land potatoes, with here and there a few cabbages, are the vegetables chiefly grown on the fens, and probably best adapted to the soil. Cabbages might, I think, be profitably cultivated to a much larger extent. Having, then, noticed, in passing, on what soils it is doubtful that turnips can be grown with a profit, it is very gratifying to know that the progressive improvements which have been made within the last fifty years in turnip culture (and are still going on) have contributed perhaps to a greater extent to the production of human food, and added more real wealth to the country, than all other improvements besides. How, then, we may best make these improvements known, and progress still higher in the science, is, sir, an object not merely worthy of the best efforts of this club, but, if I mistake not, of every true patriot in the land. For in the teeth of these astounding improvements, it must be admitted, in some districts good farming is yet the exception and not the rule. Nor is the system of turnip culture by any means uniform, even among tolerably good farmers. What, then, is the best mode of raising root crops, and at the least cost? That is the point in hand. I have bestowed some pains, sir, to get at the practice of some eminent agriculturists in different localities, and I regret that it would be taxing the valuable time of this meeting too severely to give the result of these enquiries at all at large; suffice it to say, there is no general uniformity of practice among them, and perhaps with the variation in soils we must not expect it. Mr. Henry Overman, of Norfolk, whose well-earned reputation as an agriculturist and keeper of stock, as well as for his hospitality and general intelligence, is no mean authority—this gentleman seems to favour ploughing (on his quality of soil) only a moderate depth, and still drills his swedes and mangold on the flat surface, two feet apart; and if his turnips are not the largest they are certainly the best preserved of any I have seen. Mr. Francis Sowerby, of Lincolnshire, a very extensive and spirited agriculturist, adopts the ridge system for all his mangold and swedes, with great effect; has used the water-drill to some extent, and in July last the turnips so put in seemed, I am free to admit, very much to take the lead, and I learn are still in favour. Mr. G. Russell, near Woolwich, whom Mr. Caird describes as one of the first growers of green crops in the kingdom, prepares his land by very deep ploughing in the autumn, but first uses manual labour, chiefly with a fork, to extract twitch or other noxious weeds; completing the cultivation with a scarifier, without the further aid of the plough; manuring heavily both with solid and artificial manures. Plants on the level surface, I believe, and with such cultivations on a naturally rich soil, grow (as might be expected) the most astounding crops, both of mangold and swede turnips. Gen. Hall, M.P., of Weston Colville, Cambridgeshire, is (to all who know him) no mean authority as an agriculturist. On a naturally weak soil, he commences his cultivation for turnips and mangold by very deep four horse ploughing, and then sometimes drives the subsoil plough through the chalk strata below, after which the common plough has about finished its work, the scarifier, harrows, and roller, doing the rest; when a moderate portion of farm-yard manure is applied with the bouting plough, and four or five cwt. of blood, superphosphate, or the same cost in guano, with five cwt. of salt, are put on per acre; and there, in an open tract of country, on a thin chalky soil, doubtless any of you may witness next autumn, close by the Six Miles Bottom Station, about 40 tons of mangold and hard by 30 tons of Swedish turnips per acre, growing most luxuriantly. It is but justice to say the General farms his own land, and is, doubtless, bent on its improvement, almost regardless of expense. But it only shows what may be done, by skill and capital, in the way of cultivation. I understood the General to have also commenced ploughing two furrows deep for wheat; in the success of which, however, I must be excused for remaining an unbeliever till I have the honour of paying the gallant General another visit. I will give but one other example. Mr. Charles Howard, of Bedfordshire, a young but spirited agriculturist, began cultivating turnips on the usual plan of the neighbourhood, fallowing about five or six inches deep, and after repeated ploughings, drilled his turnips but 18 inches apart, on the level land. The consequence was—being a gravelly soil—as soon as the hot dry weather of August or September set in, they almost invariably mildewed, and got so stinted in their growth that three years out of four the unthrifty plants produced nothing but a number of little hard unsightly bulbs, and they of the meanest quality. He now breaks up his land ten inches deep, with four horses—does the greater part afterwards with the scarifier, harrows, and roller—adopts the ridge system of 27 inches, in which he deposits from 12 to 15 tons of good corn or cake-made manure—has not found the water drill, so far, to answer on his soil, it producing, mixed with the superphosphate, a sort of concrete which runs the soil together where the seed is deposited, like a hasty thunder shower. Nor has he found artificial manures generally pay the extra cost; but with the above cultivations he can grow splendid crops of turnips without their aid, of which, I must say, I have had ocular demonstration. It is but justice, however, to add, the soil (in fertility) is above an average of the country. Having furnished these examples from different parts of the country, I will now, sir, with your permission, give you, as briefly as I can, my own views on the subject. If, then, garden cultivation is right, there can be no question that for root crops, as often as they occur, the soil ought to be moved much deeper than is at all necessary or desirable for the general crops of the farm. I am decidedly of opinion, however, that you obtain your object far better, in the general way, by what I call double ploughing than by one deep furrow of 10 or 12 inches, because that furrow must be proportionately wider than the depth to turn it at all properly; and on anything like stiff land you will get a huge untractable lump of earth, which the weather of no ordinary winter will penetrate or pulverize; whereas, by taking it up by two ploughs, the latter one being of higher construction and casting the furrow to the top, thereby exposing the most ungenial soil to the winter frost and rains, you leave it in a far better state than even under ordinary spade cultivation.* I think the system far preferable to one moderately deep furrow, followed by the subsoil plough, because in the latter case much of the stratum below falls pretty much into its former position, and the virgin soil receives but little benefit from the action of the atmosphere. The depth you go must depend more or less upon the nature of the subsoil; but experience will of course be the best guide. It is but justice to say that I have not hitherto adopted the system at all largely, except as cultivation for potatoes, carrots, and cabbages; but have done a considerable tract for the planting of fir-trees, and it was astonishing what fine carrots and other vegetables we grew between the trees for two or three years, even on a weak soil, without a particle of manure. In adopting this system, if land be foul, it will be desirable to do as much cleaning as practicable in the autumn before you commence this operation; indeed, among our very best agriculturists autumnal cleaning, where mangold and swede turnips are to follow, is every year becoming more general (cheers). It may be too much to say that the system can be brought to bear on all lands, but in the majority of cases (to borrow a favourite phrase of our friend Mr. Mechi), "I think I might stake my agricultural reputation upon its success." We come now to the seeding operations (for the land so ploughed will require little else than the application of the scarifier, harrows, and roller). It is evident that great authorities still differ as to the best mode of drilling. The result of my own experience, backed by much observation, is, however, very decidedly in favour of the ridge system 27 inches apart, more especially where the turnips or mangold are to be carted from the land, or stored in heaps—first, because in putting in the manure (if the weather be at all showery) you cart the soil less than by manuring on the flat surface; and if the same quantity of manure is used, you certainly get a greater weight per acre with the manure directly under the plants than otherwise, and that not more from the contiguity of the manure, than the fact that you can move the soil later, clean the land more perfectly, and perform all the hoeing operations far more cheaply, than on the flat surface at nearer intervals, in addition to which they are much more easily extracted when you take them up. Care should be had not to leave the ridges too high, to roll freely with a suitable roller, if the weather be dry, before drilling, and not to be afraid of pulling them down with the hoes, as the ridges should be lost ere the hoeing is completed; for it is quite a mistake to suppose that these kind of bulbs require moulding up. Let them only have something good to feed upon underneath; and if you want fine handsome bulbs, you can hardly disencumber them too much. You thus make the land more even, and better for the sheep, and pretty effectually obviate the too frequent irregularity of the succeeding corn crop under ridge cultivation. Had I been addressing a few raw inexperienced farmers, I might have guarded them against drilling turnip seed among dry clods, and referred them to the couplet of Tusser (I think it is), who says—

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* In passing, I might just observe that the P.P. Plough lately invented by the Messrs. Howard, and which took the prize for deep ploughing at Lincoln, as also that of Messrs. Ransome, which followed so close upon the heels of the former, appear to me admirably adapted for taking out this second furrow. And I fully incline to the opinion, that almost at any time whenever you want to go beyond seven inches, requiring more than two horses, looking at the improved state in which you leave the land, it is most economical.

> "Where clods prevail
> The turnips fail."

And on the subject of manure I should have said, guard against the prodigal system of those antiquated farmers who make no calculation of their means, but allow the whole of their farm manure to be laid sometimes on little more than half the fallows—having to finish, if they complete at all, with artificials only; but rather use it with caution, laying on but a moderate quantity of the former, eking it out with blood, superphosphate, guano, Lawes' turnip manure, rape-dust, or such other dressing as may be most approved; and he who leaves a portion of dung for wheat where most wanted (as many good farmers do) is no novice. In putting manure into ridges use but two ploughs together, one opening and the other closing in the manure close after the spreaders, avoiding exposure to the atmosphere. I have long followed the practice of dragging over the ridges a small piece of timber, or strong larch pole, reaching four rows at once, sweeping off any of the manure on the top of the ridge, and pretty well covering the dung; and in that state add the artificial manures, rather than drill them into a very narrow compass after the ridge is completed: the last plough thus closes in altogether, when you have only to roll and drill the seed. I am not, however, so enamoured of the Northumberland system as to suppose, in all situations and circumstances, it must be the best. But, on the other hand, where turnips are not for extraction, but to be fed off upon the ground, they may sometimes be grown to advantage at somewhat narrower intervals; but even in that case, I prefer, if practicable, to place them on smaller ridges, by which you set them out more effectually, without smothering the young plants. I have practised this system extensively by attaching small skeleton ploughs to a Bedfordshire drill, forming three straight ridges at a time, about 22 inches apart, depositing the artificial manure by the same operation; and I repeat it, where turnips are to be fed upon the land, this mode of cultivation, I think, has its advantages. In bringing these remarks to a close—and I fear I have already trespassed too freely upon your indulgence—I assure you, Sir, I have introduced the subject to elicit the sentiments of the enlightened agriculturists of this club, and so get them before the public, rather than at all dogmatically to propound my own. What has been said, then, backed by the experience of others, must, I think, pretty generally bring us to this conclusion—that to cultivate root crops profitably, we have first to lay the land dry by draining, if required; to clean the fallows intended for the earlier crops, as far as possible, in the previous autumn; to cultivate deeply, taking time by the forelock in getting the soil thoroughly pulverized; not to plough too frequently, nor at all when the land poaches, but, if practicable let it be undisturbed for two or three weeks previous to the last operation; to manure as freely as you can (in justice to the wheat crop) both with the farm and artificial manures; to put all crops intended for carting, or clamping, on the ridge, taking care *not to deposit your seed deeper* than *is necessary to ensure vegetation;* to hoe well both by horse and manual labour, not forgetting (as the best money spent in the whole operation) to send over the turnip and mangold wurtzel fields, as you may at a trifling cost, a few men after harvest, with a small three-tined fork, and a bag or apron tied before them, taking two ridges at a time, to extract any fibres of twitch or other noxious weeds that may be still alive; and last, though not least, to take warning by the past, and *preserve your roots well when you have grown them* (loud cheers).

Mr. **Ruston** was one of those unfortunate men who happened to farm on fen land, whose condition all who read the agricultural reports for Cambridgeshire would pronounce a deplorable one, and who, he could assure them, were entitled to all the sympathy they could obtain. The cultivation of that description of land, however, hardly needed the caution which Mr. Bennett had given them about thoroughly pulverizing the clods; for their real difficulty was not how to pulverize, but how to compress and consolidate, and get the land into such a state that the dry winds did not blow the soil away. Hence the sowing of roots on this land upon the ridge system did not succeed so well as upon the flat; for through the influence of the sun and wind, the land became so much dried up, that the seed no sooner germinated and became a plant than it died off. During the last spring he sowed eight acres of mangold, four of which were on the flat and four on the ridge system, the whole being fresh ploughed and manured. The four acres cultivated on the flat system did very well; but the four cultivated on the ridge vegetated, and then died away, and he was compelled to follow with a crop of swedes. The method he had found most successful on light soils was to manure in winter, just before Christmas, to plough the manure in, let it lie till the spring, work the land two or three times, that the manure might be thoroughly incorporated with the soil, and then apply Crosskill's roller to consolidate. He had derived great advantage from the use of the liquid manure drill, and no doubt Mr. Bennett had some of his mangold in his eye when he referred to the benefits he had witnessed from the application of the water-drill in the fen districts. Last year, he (Mr. Ruston) used it to a considerable extent, and it answered his purpose so admirably, that he invited Mr. Bennett to come down and see for himself the difference between the dry and the water drill, where all things were equal. The results of the four experiments he made during last year with mangold were—

MANGOLD WURTZEL.

No.	When sown.	When weighed.	Produce per acre—Water-drill.	Produce per acre—Dry drill.	Excess of produce per acre in favour of water-drill.
			Tns cwt st lb	Tns cwt st lb	Tns. cwt. st. lb.
1	April 1	Oct. 5	20 16 6 4	15 9 5 2	5 7 1 2
2	April 3	Oct. 5	20 19 2 4	15 16 6 4	5 2 4 0
3	April 17	Oct. 4	17 7 6 12	13 15 2 12	3 12 4 0
4	April 18	Oct. 4	13 19 2 4	10 8 1 10	3 11 0 8

Nos. 1 and 2—1½ cwt. of Lawes' superphosphate of lime, and 16 loads of manure per acre.

Nos. 3 and 4—1 cwt. of superphosphate of lime, and 11 and 13 loads of manure respectively.

TURNIPS.

No.	Sown with water-drill.	Sown with dry drill.	Excess in favour of water-drill.	Artificial manure.
	Tns cwt st lb	Tns cwt st lb	Tns. cwt. st. lb.	
1	16 10 0 0	12 7 4 0	4 2 4 0	2 cwt. of Lawes' superphosphate of lime per acre, and 10 loads of yard manure.

The produce per acre might appear small, but it should be borne in mind that the soil upon which the experiments were made was a very hot and dry gravelly one. A cousin of his had also made an experiment with the two sorts of drills on a piece of swedes, but he (Mr. Ruston) did not know the dates of the sowing and weighing. The produce per acre, however, was—on the land sown by the water drill, 16 tons 10 cwt.; on that sown by the dry drill, 12 tons 7 cwt. 4 st.: being an excess in favour of the water drill of 4 tons 2 cwt. 4 st.; the manure used being in the proportion of 2 cwt. of Lawes' superphosphate of lime and 10 loads of yard manure per acre. In the case of his own experiments, the produce resulting from the liquid manure drill was about one-fourth more than that from the dry drill; but he was convinced that the water drill would not be equally effective upon all soils, though generally, where there was a difficulty in getting the seed to germinate and the plant to grow well in the early stages of its existence—and that was the difficulty in his district—it would produce the most satisfactory results; indeed, he had never yet experienced a failure. He believed the water drill was destined to be very widely and generally used. The first time he ever saw it in operation was on Mr. Sowerby's farm in Lincolnshire, with the results of whose experiments he (Mr. Ruston) furnished the club about this time last year. Mr. Sowerby's experiments this quarter had again been successful, and that gentleman contemplated using the drill even more largely in future. But it was not alone Mr. Sowerby who, in that part of the county, appreciated the water drill: throughout the whole district its superiority over the dry drill, all things being equal, was universally admitted. With regard to the quality and description of the turnips raised on fen land, he had made some attempts to grow them; but it was not the soil that adhered to the roots: and wash and clean them as much as you like, there were still in fen turnips no properties that were calculated to nourish and improve the sheep. In fact, the land was not suitable for turnips; and though the plant would grow, his own experience led him to the conclusion never to sow turnips on fen lands again. (Hear, hear.)

Mr. J. A. **Williams** (of Boydon) said his experience with regard to the growth of turnips extended over nearly 30 years, and he had tried almost every plan in existence. When a young farmer, he began by planting in the old-fashioned way, and did not go to much expense; but he had lived to come to the conclusion that that was the most expensive manner in which turnips could be grown. He then adopted the drill system, applying artificial manure. He likewise tried the ridge system for five or six years, having bought two ploughs, and he had found that during a dry summer it was an admirable system. In a wet season, he had grown as heavy crops of turnips on that system as on any other. He had seen the ridge system successful in the case of the Lent barley crop, which always showed where the ridges were put. On the ridges being opened, the cart manure was placed in the open trench, and was then backed up with earth, and, consequently, the other half of the soil, which was left for cleaning, had no manure at all. The result was that during the summer the descending rains so manured the subsoil that in the succeeding crop they could see to an inch where the ridges were; and an inferior quality of barley or oats was grown to what would have been grown had the manure been equally distributed over the surface of the soil; he, therefore, considered that system objectionable. At the same time, he must confess that the heaviest crops had been grown under the ridge system. There was another system which he adopted; it was a fancy of his own, few other farmers, probably, having reduced it to practice. He did not see why they did not adopt the flat and the ridge system combined, using short manure, and spreading it over the surface of the soil, spreading ashes over the surface, sowing seed with a seed barrow, and then ridging up. His own experience with regard to manures went to show that the best system for general adoption was, as Mr. Bennett said, to put about half a coat of cart manure over the whole surface of the turnip crop, and to complete the dressing with artificial manure. The question, however, arose what was the most economical mode of using artificial manures. It was generally supposed that the drill was the best medium of applying them to the soil. As to the relative merits of the dry drill and the water drill, he had used both. His friend Mr. Chandler happened to live within a mile of him, and he had used the water drill invented by him with great advantage. He considered that when they are drilling in the crop, it was most economical to apply an abundance of manure. Ploughing, harrowing, and so on, cost no more; and that system by which they secured the greatest addition to the bulk by the application of manure must be the cheapest system in the long run. Mr. Williams then described with some minuteness his method of preparing manure for application on the farm; namely, by mixing solid and liquid manure in a pond near the homestead, whence it is pumped into a barrow for distribution. This, he said, was a most economical system, and preferable to the use of lime for the fixing of manure. He thought the addition of superphosphate must prove beneficial, because it would lead to an increased produce of the root crop. Experience had convinced him that in the long run the flat system of drilling was the best. In the west of England he had certainly seen better crops grown generally under the flat than under the ridge system. As to the old-fashioned system of growing turnips without manure, it was now become nearly obsolete; and where it existed at all, it must soon be discontinued (Hear).

Mr. J. Wood (of Sussex) said he had a farm with that description of soil in which Mr. Bennett said it was hardly expedient to cultivate turnips—he meant stiff clay soil; and though he did not know that his root crops were profitable in themselves, yet he thought that, taking the whole thing together, with the opportunity which the growth of such crops afforded for cleaning the land, the cultivation answered his purpose. He could not find time to clean his land in the autumn. It was not his custom to expend much money upon artificial manures—patronizing chemists and persons of that description—(laughter)—but he found that it answered his purpose to keep a great quantity of stock. He was not, indeed, adequately paid for the stock which he sent to market; but he reckoned that he obtained from his stock a description of manure which, if ploughed into the land, enriches it, and at the same time had the mechanical effect of preventing the soil from getting into too solid a state. In a wet spring he did not venture to plough; in a dry one he ploughed right across, and employed women and children to pick up all that required to be removed. He could not afford to lose his crop by having what Mr. Bennett called a clean fallow. The treading of sheep even on clay soils helped to keep down the couch and charlock. The growth of a crop must tend to enrich the land, and he considered that on the whole it answered his purpose to grow turnips. He had found it useless to attempt to grow barley after ploughing the land in the spring. For the last two or three years he had sown April wheat with advantage, in cases where oats and barley would have failed. He perfectly agreed with Mr. Bennett, that by ploughing deep they increased the value of the soil, but thought the soil should not be turned up too much to the surface. He should be afraid to plough to the depth to which he had seen ploughing carried on Mr. C. Howard's farm. The plough used on that farm was a humble imitation of the one used in Kent and Sussex. (Laughter.) When he first saw the soil, he thought it a very good one, but afterwards observed many spots where the gravel was very perceptible, and he did not think Mr. Bennett was right in estimating the land so highly as he had done. If it really answered Mr. Howard's purpose to go to the depth of a foot, all he could say was, that he was astonished at the fact. He knew that in Norfolk it was not the custom to break the pan. Not having tried the liquid manure system himself, he should like to know whether the use of the liquid drill did not in some cases cause the seed to sprout. He had always sown his seed on the flat, not on the ridge, because he never thought of drilling in his seeds till the land had been ploughed a considerable time. The question of economy turned in a great measure, in his opinion, on the description of land which was cultivatad; but he felt that autumnal cultivation was of great importance, and that the quantity of manure used, even though it involved considerable expense, had an important bearing on the question of economical cultivation.

Mr. C. Howard said he had taken great interest in the cultivation of the turnip crop. His soil was, as Mr. Wood had stated, a sharp gravel. Though he had not experienced so many hot summers as his predecessor, it had always been considered a burning soil. When he first went to the farm, he ploughed in the regular way, always having considered it advisable to get up the land four or five inches before Christmas. For some time he continued to follow the old jog-trot system; but having read much of what had been said at the meetings of the London Farmers' Club (Hear, hear), he altered his course, and commenced autumnal cultivation. He could not do the whole of his fallows, but he set out one-half, and ploughed three or four inches deep, scarified and harrowed, and picked up the twitch as much as possible. In November he ploughed up the land ten inches deep. The success which he met with resulted chiefly from the following system:—Autumnal cultivation, deep winter ploughing, wide intervals, early sowing, and choice of seed. It was, he thought, very important to keep those things in view in the cultivation of turnips. With respect to Mr. Williams's objection to the ridge system, he thought that gentleman ploughed his land far too deep at first, and therefore got the manure in too deep. If that were the case, he might have remedied it in the spring by ploughing his land across the ridges, and scarifying it in the same direction. The scarifier and harrow would have scattered the manure evenly over the surface. As regarded liquid manure, he must say that, although he had used Mr. Chandler's drill, he had not found such benefit from its use as had been obtained by others. In justice to Mr. Chandler, however, he would confess that the failure was probably owing to his want of skill in the management of the drill. He intended to try it again this year (Hear, hear). Having for some years made experiments on both the flat and the ridge system in the growth of turnips, he had come to the conclusion that the greatest weight might be grown on the ridge system, and with the least quantity of manure, because under that plan the manure was immediately underneath the turnip. Another advantage of it was that they would get the turnips at wider intervals, and could work the land better. On the flat system they could, at the utmost, hoe only once or twice; whereas on the ridge system it could be done three or four times. In conclusion, he congratulated the club on the increasing practical character of its proceedings, and on its being the instrument of such a wide diffusion of knowledge among the agricultural community (Hear, hear).

Mr. RUSTON, in answer to Mr. Howard's remark that on the flat system it was not practicable to hoe more than once or twice, wished to state that in his neighbourhood (Chatteris) the turnips were all sown twenty-seven inches on the flat, as was done on the ridges.

Mr. THOMAS (of Lidlington) had been a large grower of turnips, and, if the judgment of those with whom he had come in competition in Bedfordshire was to be relied upon, he had been a successful one. The question which Mr. Bennet had mooted that evening was one of so purely practical a nature, that perhaps he should apply himself to it best by stating to them the opinions and convictions which had forced themselves upon his mind after an experience extending over about thirty years. About five-and-twenty years ago, while residing in the neighbourhood of Worksop, in Nottinghamshire, he became deeply impressed with the extraordinary quality of the turnips grown there, combined with the cleanliness of the soil; and his special attention was accordingly directed to the cultivation of that root. On enquiring in the vicinity, he found that it was almost the invariable plan to apply the farm-yard manure made in the preceding year to the clover leys previously to the sowing of wheat, and that turnips were always grown, with an application of bone-dust, on the ridge. After a time he tried that method himself, and he must now declare that in the five-and-twenty years which had since elapsed, he had never, under any circumstances, been able to grow a better crop of turnips than he did under that system. Though there was difficulty in obtaining a sufficient supply of crushed bones, he had never found superphosphate, or bones dissolved in sulphuric acid, produce greater crops of turnips than he saw produced under the system which he had described. As regarded relative modes of growing turnips, whether on the ridge or on the flat, his own experience had led him decidedly to the conclusion that in light turnip soils, especially on the east coast of England, where there was not so much rain as in the north and west of England, the flat system was by far the best. On a very large proportion of the land of this country, the fields were so formed that ploughs could only be taken in certain directions—it was quite impossible to plough or to scarify in a cross manner—and in all such cases he had strongly recommended the adoption of the flat system. The land ought to be thoroughly cleaned before Michaelmas, and freed from couch, and every other kind of weed; then one deep ploughing previous to the long frost would be all that it would be necessary for the plough to do before the last furrow was made. The scarifier or Staffordshire harrow might then be used, afterwards there need only be a single ploughing: they might drill immediately afterwards. If he were asked his opinion as to the best method of cultivation he should certainly point to the light manures, which should of course be genuine, and the greater part should be supplied to the wheat crop. Where the system pursued was the four-course system, he would recommend that the whole of the manure should be divided equally between the four courses, instead of the whole being applied to the manuring of one crop. In the other case, the probable result was that they would grow an inferior quality of barley as well as an inferior quantity. He would advise them to be very careful, before investing their money in artificial manures, to ascertain whether or not they were worth what they would have to pay for them. In the county where he resided, after a great deal of puffing about certain manures, many of them were tried; and last year the crop on being weighed out carefully and accurately in the scales was found not to have received a halfpenny worth of benefit from them. (Hear, hear).

Mr. E. LITTLE wished to bear testimony to the great benefit which had resulted in his county—Wiltshire—from the use of the liquid manure drill. That invention was the greatest boon that had ever been conferred on the light-land farmer: it had reduced to a certainty the cultivation of the turnip on light soils. He had himself used it with great advantage for six years, and there was now scarcely a farm in his district on which it was not employed more or less. In the county of Wilts, where the farms were large, the ridge system was seldom admitted: nearly all the turnips were grown on the flat system. Artificial manures were generally applied with Mr. Chandler's drill. He had grown a crop of 22 or 23 tons per acre from three cwt. of superphosphate and half a cwt. of guano, at an expense of 27s. or 28s. per acre. It was usual in his district to preserve the greater portion of the farmyard dung for the wheat crop.

Mr. Wood wished to know if the seed showed any tendency to sprout in that part of the country?

Mr. Little said he had never seen it sprout on light soils. It had been complained that, on heavy soils, a hard substance was formed; but he had never found that the case. With the use of the water-drill, he had never lost a plant; while with the dry drill he had frequently done so.

Mr. Williams said he had never observed any vegetation of the seed; but he thought it possible that, if the land were so dry that the water-drill could only partially moisten it, the seed would be damaged. If, however, a farmer were tolerably careful in retaining the requisite moisture in the soil, the water-drill was advantageous, because it added to the moisture already existing, and secured vegetation. Moreover, the water-drill was especially advantageous as regarded filling. By filling itself, it effected a great saving of time and expense.

Mr. Owen (Clapton, Berks) considered that, if the wheat crop were put in clean, and well manured, as it always ought to be, the work was half done for the turnip crop. As regarded the use of superphosphates and guano, he thought it much more economical to manure turnip-land by such means than by carting manure from a yard a distance off, at a busy period of the year. He was convinced that the cost of applying artificial manure would not exceed that of carting yard-dung a considerable distance. Of the water-drill he could speak with great satisfaction, having used it as early as almost any one after its invention; and if he had on his farm the necessary supply of water, he would never put in turnip-seed in any other way. His soil being a dry one, he grew a great many vetches; and as the vetches were fed off, the land became dry and disintegrated. In a dry summer, very soon after the vetches were fed off, he ploughed the land, and on the third day he saw plants vegetating; within a week he could distinguish the row. Had he sown them broadcast, or with a dry drill, they would not have come up; or, if they had come up, they would not have been ready for the hoe so soon by weeks. He believed that the moisture obtained through the use of the water-drill would generally prevent sprouting.

Mr. Chandler did not know Mr. Howard's land himself, but that gentleman had stated that it was a sharp gravel, with superphosphate containing a good deal of lime; and it was quite possible that the gravel and the superphosphate of lime had formed a concrete. That was, indeed, an unusual circumstance; but it might, nevertheless, have happened. A person in Shropshire, to whom he supplied a drill, complained also of failure; and when he (Mr. Chandler) obtained from him the particulars, the conclusion which he came to was, that it was owing to the extreme porosity of the soil. It was no use applying liquid manure unless there were something like compression. He thought that autumnal cultivation was best where the soil was well pulverised. He always liked to plough turnip land before he put in the barley.

Mr. Abbot (of Castleacre, Norfolk) said the system recommended by Mr. Bennett was the one generally adopted in his part of the country. There they ploughed-in as early as they could; and if the weather was not favourable, they waited till spring. He did not concur in the opinion that ploughing should be done only once in the spring, but thought it desirable to plough three times. He was in the habit of putting seven or eight loads per acre of yard manure (reserving a certain portion for wheat), and expending from 20s. to 25s. per acre on artificial manures. The best crop of wheat that he ever grew was obtained by expending 40s. per acre upon artificial manure; the quantity applied being, he thought, on the average, 2 cwt. of guano and 4 bushels of superphosphate of lime. He thought the combination of yard manure and artificial manure was the best, both for the wheat and the turnip crop. As regarded the liquid manure drill, he had not himself used one; but his brother-in-law had done so, and the result was in that case favourable. Mr. Hudson of Castleacre, who was his neighbour, grew as large a quantity of turnips as any man in Norfolk, and he adopted the ridge system of cultivation, sowing seven or eight loads of yard manure per acre, and expending about 25s. an acre on artificial manures.

In reply to a question from Mr. Wood,

Mr. Abbot said his soil would not admit of very deep ploughing.

Mr. C. Howard: To what depth do you plough?

Mr. Abbot: Seven or eight inches.

Mr. Bennett, in reply, said, the chief difference of opinion which had been elicited by the discussion had reference to the comparative merits of the ridge system and the flat system. With regard to the turnips to be extracted from the land, or carted, or put into clumps, he had no doubt whatever, after an experience of thirty years, that an average of five or six tons per acre more roots could be grown on the ridge than on the flat system. Mr. Williams had objected to the ridge system, mainly on account of the unevenness of the succeeding barley crop. He believed that evil was mainly occasioned by putting in the manure too deeply. The failure was owing to an injudicious application, and not to the system itself. He would have defied any one to tell, from an examination of his barley crop last year, where the sowing was on the ridge, and where on the flat.

On the motion of Mr. Owen, seconded by Mr. Thomas, of Bletsoe, Bedfordshire, the following resolution was adopted unanimously:—

> "That it is the opinion of this Club that in the cultivation of root-crops the principal points to be borne in mind, having regard to the most economical mode of proceeding with the view to a full crop, are—autumn cultivation; deep ploughing, where practicable; choice of seed; judicious manuring; and seasonable hoeing."

On the motion of Mr. Trethewy, a vote of thanks was given to Mr. Bennett as the introducer of the question. A similar compliment was also paid to the Chairman, who, in replying, congratulated the meeting on the great increase in the number of members which had taken place within the last few months. In evidence of the position the Club was now attaining, he need only state that fifty-four new members had been enrolled since Christmas last (cheers).

This terminated the proceedings.

THE COMING MEETING AT CARLISLE.

"Prize Sheets for the Carlisle Meeting may be had on application to the Secretary of the Society." So announces an advertisement which has duly appeared in our columns for the last few weeks; and one naturally enough proceeds to ascertain in what Carlisle is to differ or excel other meetings that have preceded it. In all their doings the Council have never so much to answer for as they alone stand committed to in the arrangement of this sheet. The eyes of England are here most assuredly upon them. The business of Hanover-square may come easily enough. The methodical precision of a good Secretary will bring much within the scope of that terrible term, "routine," and thus "read, approved, and signed" be the real extent of many a labour. The tried ability and natural taste of a good Editor will do as much for the disposition of the Journal; while ever-anxious auditors take the best of care that no unnecessary expense is incurred, and nothing like extravagance admitted.

It is, we repeat, in the management of these country meetings the Council of the Society has to prove its use and worth. It is here the knowledge and experience of the practical agriculturist, whether landowner or occupier, come fully into play. A prize sheet to be worthy of such a meeting should be anything but a matter of routine. On the other hand, one of the first duties should be to break fresh ground. We do not mean by this that the Society should be made to encourage or sanction every new scheme or wild plan which may be brought under its notice. There must, of course, be an equal care on either side. At the sametime let the premiums offered continue to test everything which is worth trying, and hasten to develop, as far as possible, any means that may tend to the advance of British husbandry. It is in thus distinguishing between what should and what should not have their countenance that the Council will show their fitness for the position they occupy. And this, too, must be done in no merely negative spirit. Precedent should, in reality, have little sway here. Time and place must rather be the grand considerations to deal with—what the times expect, and what the place can provide.

This matter of place is itself highly suggestive of continual alteration and addition to the annual prize sheet published. A country meeting has a double duty to fulfil. We bring the machinery of the Royal Agricultural Society of England, and with it a whole host of well-known faces in attendance, not only to impart information, but to receive it. There is no district yet but that has profited by such a visit. There is none but from which in turn we have gathered something. We offer, season after season, our now established fare—our three substantial courses of Shorthorn, Hereford, and Devon—Mr. Surecard's sheep and Lord Wellbred's pigs. The best implements take their position, again, almost as much as a matter of course; general-purpose ploughs; economical drills, and trustworthy steam-engines. These are what we have to show you. It is part of our standing stock, and we exhibit them everywhere. And now, by way of variety, what can you show us? Is there no feature your own neighbourhood can embellish the entertainment with? This is the point the Council have to weigh over; to identify, as far as they can in justice, the meeting with the locality in which it is held. By so doing they may always increase the heartiness of their welcome, and at the same time add to the usefulness of their proceedings.

And so we are going to Carlisle to see shorthorn bulls and Southdown rams, light ploughs and perfect chaff-cutters, that many of us have seen all the world over. And is this all? Are the Council's energies at best, then, directed but to do as they have done? We are happy to say they are not. We believe, indeed, from all we can recollect, that never was there a stronger move in the right direction than will this year be discernible at Carlisle. Perhaps, indeed, there never was a much better opportunity for striking out a little; but it is only fair to add that this has been made the most of. We mean to have some of our friends from over the border, not merely as visitors, but as exhibitors also; and it is, be it remembered, this comparing of notes that, in agriculture as in everything else, leads the way to improvement.

We are well aware that, when any sanguine gentleman looks in at Hanover-square to suggest that so influential and wealthy a society should do this more and that more, he is pretty certain to be stayed, by an assurance from a Finance-Committee man that "this is not a wealthy society." And so this and that more are not done. Here, however, it has been done. With some very liberal and grateful assistance from the town and neighbourhood of the merry city itself, the Council *have* the means, and we can only repeat that they have used them well. We have a whole series of classes and prizes for Scotch cattle, Ayrshire, Angus, and other polled breeds, Highland and other horned breeds, for Galloways (specially apportioned), for Cheviot, for Herdwicks and other mountain sheep, with thirteen prizes for Clydesdale horses—a well-merited compliment, proceeding directly from the funds of the Society. In addition to these, the mayor and other gentlemen of the county have again filled up a weak place in the programme with special prizes for hunting and coaching stallions, for riding and harness mares, with an additional offer or two for hack and cart colts and fillies.

This is all very good. In the implement department we could hardly look for any so great or appropriate a variety. There is, however, an additional prize for the reaping machines, even still far more popular in the north than anywhere else; while in deference to time, perhaps, rather than place, there is the great out-standing TWO HUNDRED POUNDS REWARD for a steam cultivator that shall efficiently and economically hasten the doom of the plough and the spade! Who will be the bold man to claim it? The London Farmers' Club, perhaps, may be able to enlighten us at their next meeting in May, when this topic comes on for consideration. It will be at least amusing to notice how far their conclusions can anticipate the Ides of July.

The Council of the Royal Agricultural Society of England have done their duty: let the breeders of the North now do theirs, and treat us to such a show of Scotch cattle, mountain sheep, and Clydesdale horses, as shall be worthy of themselves and the occasion. In the significant notice with which we began—"Prize sheets may be had upon application."

THE APPLICATION OF MANURE IN A LIQUID OR IN A SOLID STATE.

It may be stated, but at the same time be found difficult to be proved, that—what Mr. Chadwick has asserted, and Mr. Mechi corroborated—by combining large quantities of water with manure its beneficial effects upon vegetation will be increased. Mr. Chadwick states, that if farm-yard manure is saturated with water, the liquid thus obtained will be far more beneficial to plants than it would have been had it been applied in its solid state. No one, for a single moment, however, we conceive, will be ready to admit this assertion as correct. In what way can it take place? The soluble portion of the manure would alone be extended by saturation; the solid portion alone would remain. No addition except that of water would take place; and although this might assist in producing a sudden development of the plants, it would there end, whilst, upon the other hand, the more solid portions would remain useless as manure. But in the event of its having been applied in the ordinary way, the whole would by degrees have become comminuted with the soil, and would gradually, as it became decomposed, have afforded food to plants for a far longer period of time, and, by thus affording nourishment, would bring the plant to a more healthy development than it would if applied in a liquid state—in that case acting as suddenly as guano; in the former instance, as ordinary farm-yard manure, extending its influence throughout a whole course of cropping.

If we adopt Nature as our teacher, we can rarely err. Every portion of the vegetable kingdom is returned to the soil, either in its original state, to become slowly decomposed, or after it has been appropriated by herbivorous animals, by their fæcal deposits; and in either case, the decomposition goes on gradually; the food destined for the reproduction of plants and vegetables becomes spread over the surface, until, by the action of heat, air, and moisture, it is again rendered soluble, and is conveyed to the roots of plants, to be daily made available by them for their support. Vegetables, like animals, in a growing state, require food in continuous succession throughout the whole period of their progression; and it is only during winter, when the temperature is too low to produce decomposition, that the supply ceases.

The experiments that have been made upon guano, and other similar highly-stimulating manures, confirm this opinion; for it has been found that if the application is made at once, it is not nearly so beneficial to cereal crops as when made by two or three applications, at three or four weeks' interval. With turnips and root crops it would be otherwise, as these plants require manure in their early growth, making up for the deficiency afterwards by the assistance of their leaves. To crops, therefore, of this description, liquid manure would probably be highly beneficial, inasmuch as their growth would be stimulated in a more rapid manner than by the application of manure of a more solid character.

As the urine of animals contributes more largely to the manufacture of farm-yard manure than their solid deposits, it becomes the chief ingredient in their composition, and is at the same time the most valuable for its nitrogen, and combining with the carbon unitedly becomes food for plants, and of all descriptions most suitable to their growth; but to bring out its properties fully, it should be allowed to putrefy, by which its ammoniacal salts are formed. One portion of this ammonia unites with the lactic acid, and forms lactate of ammonia. The other portion becomes volatile, in the state of carbonate of ammonia.

By this action the formation of carbonate of ammonia entirely alters the character of the urine, converting it to an *alkali*, in place of an *acid*, as in its natural state; and it thus becomes more valuable by far as a manure; and this is the explanation why urine in a putrefied state is to be preferred as a manure to urine in its fresh or natural state. The only difficulty that ensues is, by reason of its volatile character much of its manuring property would be lost if due care should not be used to secure it. This would undoubtedly be best effected by gypsum applied to the surface, or be immediately secured by covering it with the soil.

The intention of these observations is not to demonstrate how urine becomes decomposed, or how, in a chemical sense, it becomes improved by decomposition, but to show that in either case of applying it in a liquid form to the surface, a larger proportion of its manuring quality would not be brought into action; and, in the event of its being decomposed, that a still larger proportion would fly off unless the surface of the field had been previously strewn with gypsum, or some substance of similar character.

We have here a key to the solution of this question, and we must confess that it does appear to us that the application of manure in a solid state is not only the most natural, but also the most likely one to have the utmost advantage from it as a manure.

The operations of Nature, to a certain extent, can be explained; but still there are results that, notwithstanding all our investigation and research, baffle our inquiries. Take, for instance, the application of marl, chalk, and chalk clay, to land that has never received an application of it before: the effects are marvellous. The land continues for years afterwards to improve, even under a scourging system of cropping, and its beneficial effects will extend over a period of from twenty to thirty years; but no second application will have any such effect after, however long a period such second application is made; and instead of stimulating crops as at first, it will barely become perceptible; and it is from this cause that the old marl-pits found in various districts have fallen into disuse, and not from any deleterious matter that has since entered into the composition of the marl, as has lately been insisted upon by a contemporary journalist. As fresh vegetable mould undoubtedly contains a larger proportion of carbon than old cultivated soils, and carbonic acid also exists in much greater proportion, these assimilate with the carbonate of lime applied as chalk, chalk marl, or chalk clay, and from being slowly soluble by the action of cold water, become by this solvent gradually converted into food easily taken up by the spongelets of the roots of plants, and from which they continue to derive a supply for a great length of time afterwards. But if such were alone the cause, we might infer that after a lapse of many years the same effect would again follow, and the same benefit would again result from the second application. Such, however, is not the fact. Carbonate of lime acts, however, in more ways than one, and by its operation mechanically renders the soil loose and porous, which is always followed by highly beneficial effects, and it is probably to this cause that much of its beneficial influence may be attributable.

The proper application of lime as a manure is, we fear, but little understood. We certainly know that it is frequently applied when it cannot be attended with the slightest benefit whatever. Land already containing too large a proportion of carbonate of lime would be injured by a further application, and yet we daily see lime bestowed liberally to land of that description, and even in direct opposition to remonstrance upon the subject.

It would require a much larger space than we can devote to these subjects to elucidate them clearly. We hope, however, from time to time to be able to revert to them with that view, and in the meantime invite our readers' attention to the subject, as one of the utmost importance, and almost paramount to every other consideration in the economy of agriculture.

NUTRITIVE QUALITIES OF THE ONION.—It is worthy of notice as an extensive article of consumption in this country. It is largely cultivated at home, and is imported, to the extent of 700 or 800 tons a-year, from Spain and Portugal. But it rises in importance, when we consider that in these latter countries it forms one of the common and universal supports of life. It is interesting, therefore, to know that in addition to the peculiar flavour which first recommends it, the onion is remarkably nutritious. According to my analysis, the dried onion root contains from twenty-five to thirty per cent. of gluten. It ranks, in this respect, with the nutritious pea and the *gram* of the East. It is not merely as a relish, therefore, that the wayfaring Spaniard eats his onion with his humble crust of bread, as he sits by the refreshing spring; it is because experience has long proved that, like the cheese of the English labourer, it helps to sustain his strength also, and adds—beyond what its bulk would suggest—to the amount of nourishment which his simple meal supplies.—*Professor Johnston's Chemistry of Common Life.*

THE CULTURE OF MUSTARD.

There are two varieties of Mustard commonly cultivated, both of them for a seed crop, and one of them occasionally for a forage and as a green manure crop. As this is about the time for putting them in, we will give a short account of them, and their cultivation, management, and produce. The two varieties are known as the "Brown Mustard," and the "White Mustard."

THE BROWN MUSTARD is that variety which produces the seed from which that well-known yellow powder is manufactured, and used as a condiment at every table. It is esteemed for its pungency of taste, and, when mixed with water for service, it passes under the distinctive appellation of "mustard," and is served at table in "the mustard pot." From the seed of this variety is also obtained a considerable produce of oil, of good quality, used for burning in lamps; but in this respect it is inferior to the white variety. The plant of the brown mustard grows very luxuriantly, and to a great height. The little deep-red grain or seed, as the Scripture hath it, "indeed is the least of all seeds; but when it is grown, it is the greatest among herbs, and becometh a tree, so that the birds of the air come and lodge in the branches thereof." This is a true and beautiful description of the growth of the plant. Its stem and leaves are rough and prickly, and pods smooth, in most respects similar to that pest of all lands, garlick, charlock, wild mustard, or by whatever name it is known, except in its highly cultivated gigantic growth, and productive qualities.

THE WHITE MUSTARD.—This is by no means of such prodigious growth; it is very similar to the common radish plant; when left to produce seed, it grows rapidly, however, and yields a large produce of both forage and seed. The forage, or full-grown green crop, is often ploughed in as green manure. The seed is a round yellow grain, like to coriander seed, and produces a good yield of oil of excellent quality for burning in lamps; and, when distilled with water, both varieties furnish a volatile oil of great pungency, which is frequently used to raise blisters, and for purposes medicinal.

CULTIVATION.—The brown mustard requires land of rich quality. It is usually sown as a first crop in breaking up loams, and soils of somewhat above medium quality; in such cases, the land should be ploughed early in March, at a moderate depth, and should lie sufficiently long to allow the decomposition of the grass sods or sward; this will generally take place in three or four weeks, and, as the surface will in that time become loose and mouldy, sowing may commence, and be continued up to the middle of April. This should be done broadcast, and the quantity of seed need not be more than one-fourth of a peck per acre, to be harrowed in lightly, or just so much as to cover the seed. As the plant is weak in its first stages of growth, it will need every encouragement; the grower, therefore, may wait a favourable opportunity to sow. All sods or clods should be raked into furrows or rows. One good hoeing and thinning should take place in May; the thinner the better, if the plants are strong and healthy. In sowing brown mustard on old cultivated lands, care must be taken to have them in a high state of fertility, and well replenished with manure; the course of culture the same, taking care not to disturb the growing plants too much.

The white mustard may be sown on all soils of moderate depth and fertility. For this crop the land requires more culture: it cannot be got into too fine a state, nor can the land be too thoroughly pulverized, as in fallowing; and the plant is of such rapid growth and early maturity, that sowing may be deferred so late as the first of July; however, it is best to sow earlier. The best practice is to put in this crop with bone-dust, or superphosphate; about three-fourths of a peck of seed, and ten bushels of bone-dust, or its equivalent, per acre, is sufficient, to be drilled in rows about one foot apart, and lightly harrowed in. Very little further notice is required till harvest day. In sowing this crop for green manure, the same process should be pursued, as also for a forage crop. The lands, for the better turning in the green manure, should be set out before drilling, and a deep furrow left, in which to turn "the first ploughing up" of the full grown crop. In ploughing in, "a clog" of sufficient weight must be attached to the plough hake, with chain, to allow the clog to drag along the furrow, and fastened to the top of the coulter-shank, so dragging as to keep down every stem till covered by the passing furrow. Rolling should immediately follow; and when the plant is sufficiently decayed, the drilling of wheat may go forward without any other aid than a good harrowing.

The best state for feeding off this crop, or of ploughing it in, is immediately before the podding takes place, or, at all events, is much advanced; otherwise it becomes too woody and coarse. It produces a large quantity of food; but to make the best of it, heavy stocking is desirable, lest it grow too strong and fibrous; it then becomes unhealthy for old sheep, and indigestible to young ones. It is said that both the brown and white varieties are of great use in preventing the ravages of wire-worms. We know that little beetles have instinctive faculties, as well as that of larger growth; they will not deposit their eggs in unpalatable places. The land should be well worked and cleaned after each crop, and every seed made to vegetate, otherwise they become injurious to succeeding crops, particularly the brown variety. On good soils, several of these crops may be taken in succession, if required; or an intervening corn or potato crop may be advisable.

Management.—The great point to be aimed at by the grower is to produce his seed well grown, and of a reddish-brown colour; bright and fresh, grey or discoloured seed is of very inferior value; hence the necessity of giving his plants plenty of room to perfect their seed, to get it harvested without rain. The first thing to be attended to is the ripening. Experience has almost determined a rule or guide. When the pods on the top turn to a deep brown approaching purple, and those low on the stem are turning to a light brown, it may be cut, and should be tied into sheaves, or laid in reaps if intended to be thrashed immediately: tieing into sheaves, and "pieing," is the best practice. The pieing is one of the most difficult operations in stacking: every sheaf must be so laid that the lower ends of the outer sheaves droop downwards, so as to shoot off the rains, and prevent damage from wet; the form is invariably round, and when a sufficient height is attained, it is finished with a high, conical, or "sugar-loaf" roof, topped by some long sedge or similar covering. Great care is requisite in leading to the pie or stack. In mustard-growing countries it is a kind of business to individuals who keep a stock of "mustard cloths," sleighs, sieves, &c., which they let out for stacking and thrashing; but common farm-carts, fitted with cloths or coarse sheets, will do very well: all that is required is to prevent loss from the shelling seed while loading and teaming. It is usual to thrash with the flail in the field. The sheaves are generally very long and dry, and a stroke or two will beat out most of the seed. Dressing the seed is a peculiar task, and requires an experienced hand; the mustard sieve and a steady wind being essential to clean and correct dressing. Mustard seed will not keep well in granary: the best way to keep it is in the pie.

Produce.—The yield of straw or haulm is very great, and the common practice is to burn it. This is wrong: it makes good steddles for corn stacks, and good litter for the bottom of the fold-yard. The yield of seed is various; as much as 42 bushels of brown mustard have been obtained per acre, but the general average would be from 24 to 28 bushels per acre; of white mustard, the general average would be from 25 to 40 bushels per acre. The price is very fickle, the brown mustard varying from 7s. or 8s. to 50s. per bushel; and of white mustard, from 2s. 6d. to 25s. per bushel. The present prices are, of red or brown mustard about 15s. per bushel; of white, about 9s. per bushel.

FARM FENCES—AND THE INCLOSURE OF COMMON LANDS.

During a protracted season, in which, perhaps, an unusual measure of attention has been bestowed upon cutting and trimming hedges, and making farm fences clean and tight—and the proper manipulation of a sturdy quickset is a matter requiring so much judgment and skill, that a first-rate hedger is a rare and valuable man in any neighbourhood —it has occurred to us, that the question of *having any fence at all* to trim needs to be meditated upon. We do not mean, as to the proper amount of subdivision of a farm into fields; whether there shall be no partition-fence whatever, as in some parts of Kent; very few, as on light-land hills, where the four-course husbandry is practised; or whether there need be half the bushy hedges and choking hedge-row timber which chequer and encumber the surface of counties like Devonshire. We refer to the very antiquated subject of the inclosure of common and open field into several, which has again come into public notice by the passing of an Act of Parliament to facilitate this object. It seems hardly credible that, in these progressive days, there should remain many parishes, in various counties, having wide, open, arable fields, tilled in stripes and patches by numerous small occupiers; or else spacious pasture commons, stocked with a heterogeneous minglement of all the species of domesticated animals; these being supposed to benefit the surrounding farmers and cottagers, by picking a scanty subsistence without the cost of a rent. We do not include the elevated moors, furzy heaths, and barren rocky wastes, requiring expensive reclamation; or yet such tracts of thin down land as are useless except as sheep-walk; but only arable, pasture, and meadow land, which presents no physical hindrance to inclosure. Our readers know very well that the open field arable system was formerly universal throughout Europe, from Andalusia to Siberia; and that at this day little progress has been made towards its abolition, except in our own island; and it abounds always in proportion to the backwardness of the country in which it is found. But little more than half a century ago, a village of farmers and labourers, surrounding a church, and environed by three, four, or five open and extended arable fields, formed the usual spectacle of Cambridge, Huntingdon, and Northamptonshires, as much as on the Loire, and on the plains of Moscow. And the work of inclosing was not completed in the days of Arthur Young, and the indefatigable Board of Agriculture. Many inclosures have very recently taken place; and our readers must not be surprised to hear that many parishes in the kingdom still wait for this first step in agricultural improvement.

Commons were anciently of two kinds: a portion being occupied by the tenants of the manor, who kept part of it in hay for the winter provision of their cattle, and who cultivated the rest for grain. They were occupiers, however, only during a part of the year, the ground being common to the inhabitants of the manor directly the crops were secured—all, by mutual agreement, keeping the cattle out of the cultivated parts until after harvest. They also shut up, and sometimes enclosed, suitable plots of the commons for mowing, suffering the common herd of live stock to graze all, from the time the hay was carried to the season for again laying in the meadow. Another portion of the common land was appropriated for supplying the inhabitants with wood (for fuel, building houses, constructing implements, &c.); also with turf or peat, and herbage; where, in tolerable seasons, the various live animals of the lord and his tenants found their subsistence. Does not much the same state of things exist in many localities at the present moment—either as regards pasturage commons, or the flats of meadow land, bordering many a flooding watercourse, and marked out into hay allotments by posts or ditches? There are cases in which one or two great farmers, whose lands are conveniently situated, adjoining a large, dry, and valuable common, may possibly make a larger profit, by sweeping off all the food by flocks of folding wethers (and so starving all the stock belonging to their humbler neighbours), than they could expect to get from any share which inclosure would allot to their respective farms. But, where equity is at all considered, and live stock pick up "neighbours' fare," owing to unsheltered exposure to the hardships of weather, and poor living (from the impossibility of the commoners agreeing to any permanent improvement of the ground, or proper management of the animals), there is generally a most inferior, unthrifty flock and herd; and losses swallow up all the advantages. Of course, while every one turns-on what he pleases, generally in such numbers from each greedy owner as to overcrowd and pine the entire common, all selection, which is the soul of breeding, is impossible. And as to feeding, no animal can fatten on the usually miserable keeping of such a spoiled pasture. The advantages of inclosure to the *farmer* no one, in these days, needs to be informed of, it being evident that the removal of the above evils, and the placing of the several apportionments under the control and management of individual occupiers, must be attended with profitable results.

Proprietors, again, will undoubtedly obtain far more in the shape of acreage rent than they now do from the common rights, and stocking, and other privileges. What a wretched state of things, then, is betokened, when broad tracts of common land are left unimproved in the midst of a hungry community, owing to the niggardly fears, or private disagreements, of the abutting landowners!

The interest of the *labouring classes* in inclosure is not so clear. They lose the right of common shackage, or the feeding of geese and pigs, particularly where there is any open field arable; the opportunity of getting fuel; together with various other advantages, which tend to furnish them with a few cheap comforts. And where open field arable is laid down to grass after inclosing, the demand for labour becomes less. But when common pasture is broken up, as is generally the case, the tillage of the waste spots, and the increased growth of labour-making crops, consequent upon a better order of cultivation, provides more work and a better livelihood for the poor. And the various little advantages enjoyed by cottagers ought to be purchased by the inclosing parties, with an equitable compensation.

In this period of high prices, will not each of the localities concerned strive to obtain an inclosure? and if mill-streams, or still larger rivers, for want of improvement, compel the present system of open meadows, will not the surrounding agriculturists add their voice in favour of a better arterial drainage?

TO ASCERTAIN THE WEIGHT OF HAY AND CORN BY MEASUREMENT.—In a long square stack, measure it as a parallelopiped, by taking the length, width, and the height to the eaves, and by taking the medium of these dimensions, as they may differ at top and bottom. These multiplied together will give the solid contents in feet or yards, as may have been used in the measurement; and multiplied by 8, 10, 12, or 16 will give the number of stones, according to the age, quality, or condition of the hay. In measuring the roof it is customary to add one-third of the slant-height to the height of the stack from the bottom; but the true way is to measure it as a triangle of half the area of the square measure in length, width, and height, and then added to the contents of the stack. In measuring a round stack, the common way is to measure the girth in several places for a mean girth; and then, because the areas of circles are proportional to their circumference, and because the area of a circle whose circumference is 1 will be .07958, to multiply the square of the mean circumference by the above decimal, and that produce by the height of the stack to the eaves, and one-third of the roof added, together. The result will give the contents in solid yards or feet, as may have been used. The true way will be to measure the stack to the eaves as a cylinder, by multiplying the area of the base by the height, viz., by squaring the circumference and multiplying by .07958, and then by the height to the eaves. The top of the stack is a cone, and the contents may be found by multiplying the area of the base found as above, by one-third of the height. The rule first given is the most ready, and sufficiently correct in practical purposes. Corn-ricks may be measured in cubic yards, and one bushel of grain allowed to each yard in cases of average production; advancing or reducing as the crop has been reaped by sickle or mown by scythe, and may be long or short in the straw, and otherwise productive or wanting.

ON PARTURIENT FEVER IN EWES, "GIDDINESS ACCOMPANYING PARTURITION."

BY ISAAC SEAMAN.

(Prize Essay.)

Parturient fever in ewes ("giddiness accompanying parturition") forms a very interesting and important subject for investigation, with the true nature of which the shepherd and flock-master cannot be too well acquainted.

The term "giddiness" signifies stupor, sleepiness, delirium; and is universally applied by shepherds and flock-masters to sheep suffering from hydatids, or water in the brain. Now that we may distinguish this so-called giddiness accompanying parturition in ewes from other diseases bearing the same name, I propose to call it paturient fever; "for in calling different ailments by the same name," as observed by an eminent writer on influenza in horses, "our description of diseases becomes involved in obscurity; we never agree as to the treatment, and investigation into their characters becomes more difficult than nature intended." I call it parturient fever, because fever it really is, as the appearances before and after death will show; and it does not affect the ewe at any other time than shortly before and after lambing (parturition).

Parturient fever is an affection of common occurrence, and was attended with much fatality amongst the flocks in the counties of Cambridgeshire and Essex during the lambing seasons of 1852-53. It is remarkable for the suddenness of its attack, the rapidity with which it runs through its different stages, and its general mortality to those affected by it. It is so violent in its attack, and rapid in its progress, that it may prove fatal in twenty-four hours, if not arrested by the most decisive means. It affects most commonly ewes of a delicate constitution, such as the Sussex Downs: the more hardy Lincoln and Norfolk ewes are comparatively exempt from the disease. It manifests a more severe form in aged ewes and ewes bearing twin-lambs.

Causes.—Any circumstance or agency which depresses the power of the system, insufficient or improper food, close folding, exposure to fatigue, to cold, and moisture, may be considered causes of the affection. I have repeatedly noticed where ewes about a month before lambing have been removed from a sufficiency of wholesome food to other possessing less nutritive qualities, they have suffered greatly from parturient fever. The practice of fattening sheep and ewes, being fed on the same piece of turnips (the best parts of which are consumed by the former, whilst the roots and other inferior parts are consumed by the latter), ought to be abandoned; a small fold, too—a circumstance so essential to the development of fat in the one, whilst highly injurious to the pregnant ewe, to whom exercise is of the greatest importance for the maintenance of health. Moist and warm seasons, vegetables growing luxuriantly, and the non-supply of dry farinaceous food, are alike productive of the affection. Fat condition is thought to be a grand cause of the disease. I certainly have noticed the Sussex Downs (a breed most disposed to collect fat) suffer most, and, as I before stated, a delicate sheep; but losses have been sustained, from the fact that the breeder, thinking them too fat, a short time before the full period of gestation lessens the supply of food which is plentiful and nutritious, and substitutes that of a poorer nature. I well recollect the circumstance of an extensive breeder unknowingly feeding a number of pregnant ewes for the butcher, who did not discover his ignorance until after sixteen weeks' gestation: the ewes at this time were fat enough for slaughtering. Alarmed with the fear of losing them in lambing, he disposed of them to an experienced sheep-dealer; the dealer did not think there was any particular danger in lambing such ewes, and continued to feed them upon the most nutritious diet, such as linseed-cake, oats, hay, and turnips. He had not a case of parturient fever, and his losses otherwise were not more than 2 per cent.

SYMPTOMS.—The most early symptom that marks the commencement of this disease: first the ewe suddenly leaves her food, twitches both hind legs and ears, and returns again to her food; during the next two or three days she eats but little, appears dull and stupid; after this time there is a degree of general weakness, loss of appetite, and giddiness, and a discharge of dark colour from the vagina; whilst the flock is driven from fold to fold, the affected sheep loiters behind and staggers in her gait, the head is carried downward, and the eyelids partly closed. If parturition takes place during this stage of the disease, and the animal is kept warm and carefully nursed, recovery will frequently take place in two or three days; if, on the contrary, no relief is afforded, symptoms of a typhoid character present themselves, the animal is found in one corner of the fold, the head down and extremely uneasy, the body is frequently struck with the hind feet, a dark-coloured fœtid discharge continues to flow from the vagina, and there is great prostration of strength. A pair of lambs are now often expelled in a high state of putrefaction, and the ewe down, and unable to rise; the head is crouching upon the ground, and there is extreme insensibility; the skin may be punctured, and the finger placed under the eyelids without giving any evidence of pain. The animal now rapidly sinks, and dies often in three or four days from the commencement of the attack. Ewes that recover suffer afterwards for some time great weakness, and many parts of the body become denuded of wool.

TREATMENT.—The ewe immediately noticed ill should be removed from the flock to a warm fold apart from all other sheep, and be fed with oatmeal gruel, bruised oats, and cut hay, with a little linseed-cake. If in two or three days the patient continues ill, is dull and weak, a dark-coloured fœtid discharge from the vagina, and apparently uneasy, an attempt to move the lambs should be made. The lambs in a great majority of cases at this period are dead, and their decomposition (that is, giving off putrid matter) is a frequent cause of giddiness and stupor in the ewe. If the os uteri (the entrance into the uterus) is not sufficiently dilated to admit of the hand of the operator, the vaginal cavity and os uteri should be smeared every three hours with the extract of belladona, and medicine, as follows, given:—

Calomel	8 grains
Extract hyoscyamus	1 drachm
Oatmeal gruel..........	8 ounces

Mix, and give two table-spoonfuls twice a day.

Epsom salts	8 ounces
Nitre	½ ounce
Carbonate of soda......	2 ounces
Water................	1 pint

Mix and give two wine-glasses full at the same time the former mixture is given. Let both mixtures be kept in separate bottles, and well shaken before given. The bowels being operated upon, omit both former prescriptions, and give the following:—

Nitre	½ ounce
Carbonate of soda......	1 ounce
Camphor	1 drachm
Water................	8 ounces

A wine-glass full to be given twice a day.

Feed the ewe principally upon gruel and milk or linseed porridge. Parturition having taken place, the uterus should be injected with a solution of chloride of lime, in the proportion of a drachm to a pint of warm water, and repeated twice a day whilst any fœtid discharge from the vagina remains.—Journal of the Royal Agricultural Society of England.

DEEP AND SHALLOW DRAINING.—At the Northamptonshire Agricultural Association, Mr. Inns observed that a few years ago he was the single-handed advocate of deep draining at several years' audits successively. He thought four feet was not too deep for fair average land. He disapproved of tile pipes of less diameter than 2 inches or 1¾, except for finishing off: the idea of 1in. pipes for five or six chains of land was absurd, while the whole saving by them did not exceed 5s. per 1,000, and a little extra for cartage. He thought from eight to eleven yards a proper distance for the drains on ploughed land, while on grass land a less distance than from fifteen to twenty yards would be likely to prove an evil. That day they had found the water springing from the bottom of the drain 3ft. deep, and in the 4ft. drains at between 2 and 3 feet. Mr. Wilson said he was superintending some draining for Mr. Cartwright, at Aynhoe, and begged to differ as to much shallower drains being used for strong lands. Were they ever so strong he found more water discharged at 4ft. than 3ft. After the first two feet the land got more friable and yielded more water. Alluding to one of the competitors from his neighbourhood, he attributed his defeat solely to his having only brought tools suitable for 2-inch pipes, having understood that was the size to be used, instead of 1½-inch.

VISIT TO THE FARMS AT YESTER.

If success is the criterion by which agricultural improvements should be tested, and from which a decision is to be formed as to their judiciousness, the operations at Yester must command universal approval. In 1850 we gave a detailed account of the improvements on the farms of Broadwoodside, Yester Mains, and Danskin. Having again visited these farms on the 9th of Janury last, we are enabled to report still farther as to their success.

The following is a short synopsis of these improvements:—

Broadwoodside and Yester Mains contain about 800 acres, elevation about 600 feet. The soil was naturally a poor thin clay resting on sandstone. The subsoil varies considerably, but is generally more friable than the soil; a part of it is a yellow sand, though other parts are a stiff yellow whitish clay. So inferior was the soil of Yester Mains generally regarded, that a very shrewd and facetious farmer, whose road to and from Haddington lay through this farm, was wont to remark that "he hoped the Marquis of Tweeddale would always keep Yester Mains in his own hand, as it would give him a very good idea of what his land was worth." But a better criterion as to the original value of the land was that Mr. Howden, Lawhead, and Mr. Brodie, Abbey Mains, prior to 1840, valued the lands at 14s. per S. acre. We have no hesitation in stating, that if these farms were in the market at present, they would realize 42s. or more the imperial acre, and would prove at that rent a better bargain to a tenant than the land in its original state at the rent of 14s., provided he had not energy and capital to bring it up to its present condition, with a length of tenure necessary to enable him to reap the benefit of his investment.

The first step in the improvements was to drain the land—depth from 2½ feet to 2 feet 9 inches; distance apart being generally regulated by the breadth of the ridges, usually 15 feet. The next step was deep ploughing. The plough used had a mould slightly convex, drawn by four horses, and which rather pushed the soil aside than turned it over. Thus, the subsoil was never thrown upon the surface, but only gradually mixed with the soil by after cultivation. The next step was subsoiling, generally across the ridge. This was done by a plough invented by the Marquis, and formed by the late Mr. James Slight, Leith-walk, styled the "Tweeddale subsoil plough," which, while it loosens the subsoil, does not bring it to the surface, and which, drawn by four horses, and following the surface plough, also drawn by four horses, stirs the soil and subsoil to the depth of 18 or 20 inches. As some fields were full of boulder stones, these required to be removed. The expense of draining per acre was £6 16s. 10d.; subsoiling and removing stones was £1 0s. 7d.; but this estimate was under the actual outlay, as the deep cultivation and subsoiling were found to have diminished the amount of labour in spring to a very considerable extent. The other expense, liming, £5 an acre, may be regarded as one of the ordinary improvements of farm cultivation. Thus for an outlay under £10 an acre, and judicious management afterwards, land has been raised from the value of 14s. to 42s. an acre. It is highly creditable to the Marquis that, on laying the foundation stone of the new corn-market in Haddington, in 1853, his Lordship, after remarking on his claim to be an extensive farmer, occupying 1000 acres, generally attributed his success to the example of an eminent farmer, to whose memory we lately paid a merited tribute. "Everybody," said the Marquis, "had a star in the firmament to steer by—his star was Mr. John Brodie, of Abbeymains."

Danskin farm has special interest from the extraordinary success which has attended the application of moss. Danskin has an elevation of upwards of 700 feet. The soil is also clay; but being part of the debris of the Lammermuir hills, the soil is more varied than the other two farms. Here draining, subsoiling, and, latterly, the application of moss, at the rate of from 120 to 180 tons per acre, have completely changed the appearance, as it has changed the character of the soil. The moss is obtained from Danskin Loch, and was raised by an incline railway and a fixed engine, much on the same principle as in the conveying of minerals. After the moss was raised to the level, it was removed by carts for application to the soil. Seeing the success which attended the application of this moss at Danskin, a line of railway was made so as to convey the moss nearer to the farms of Yester Mains and Broadwoodside. On this latter farm the moss has been applied with great success to a clay field by breaking up its cohesiveness, and preventing it again running into a compact state from excess of moisture. An analysis of the moss by Dr. Anderson gives the amount of nitrogen to be nearly 1 per cent., one sample being 0.85, another 0.89 per cent, the moss supplying to the soil about a ton to a ton and a half of nitrogen, equal to the quantity of nitrogen contained in about eight tons of guano. Moss is now employed as the first layer in the dung-courts, feeding-boxes, and sheep-folds. By this means the quantity of manure is greatly augmented, and the whole liquid of the manure heap retained. Unlike the management of other highly cultivated farms in the county of East Lothian, little or no portable manures are purchased. Rape dust was at first preferred; latterly Peruvian guano, but in no single season has the quantity exceeded 10 tons. Now, what is the result with this very limited allowance of manure, being one-tenth of the quantity on the best cultivated farms in the county, and these naturally greatly superior in soil, and also in locality, from the altitude of these farms? The wheat grown is very superior. Upon Danskin, between 700 and 800 feet above the level of the sea, after plain fallow, with a dressing of moss, the produce was about 37 bushels the imperial acre, and the quality so superior that the wheat from this farm, as well as the others, obtain generally the highest price in the Haddington market, the weight being generally about 64lbs. per bushel. The sample is clear and flinty, showing that it contains a much larger per-centage of gluten than the ordinary wheats grown in the district. Then, as regards barley, the produce is very large, being above the average of the county, and generally about 56lbs. to the bushel. Now, these are curious facts in reference to these two cereals, which are believed to require the best climate to produce them in perfection. The turnips this year were quite superior to those grown in the county: one field of the Swedish variety was stated to have been 32 tons the imperial acre; but as the crop was all removed from the ground and stored, we could only judge of the appearance of them in the pits, and we have no hesitation in saying that some error in measurement or weight must have crept in, as the size of the bulbs did not indicate that the crop exceeded, if it reached, 32 tons the Scotch acre. The crops of purple top yellow and green top yellow were, however, undoubtedly large crops, and may have reached, per Scotch acre, 40 and 32 tons respectively. The purple top yellow particularly were of the very finest quality of flesh, and must contain a large per-centage of feeding matter.

At Broadwoodside, at the time of our visit, a considerable number of half-bred hoggs, Leicester and Cheviot, were folded in a shed and curtain, and were being fed upon cut turnip. The bottom of the shed had a coating of moss which was covered with straw, and the shed was supported on wooden posts, with rails. The sheep did not indicate very healthy progress; hay, and perhaps an allowance of rapecake, would have changed their appearance, from the hay assisting the digestion of the turnip, and the rapecake from containing more of the elements of nutrition, and also from the beneficial effect of variety of food.

At Yester Mains a large quantity of cattle were put up to feed. A considerable portion of these were North Highlanders, and very indifferent specimens of, perhaps, the least progressive of any of our Scottish cattle. They are also, from their habits, ill adapted for feeding in boxes. Their coats had been all clipped, but at the time of our visit were sufficiently rough to defend them in open courts. Part of the cattle were, however, half-bred short-horns; and these will most probably leave double or, perhaps, triple as much for their keep as their Highland brethren. The boxes were bedded with moss, which was also applied to prevent any escape of liquid. Here a new feeding-shed was erected, being wholly of wood, and consequently put up at very little expense. It is deserving of inspection by those parties who are not disposed to lay out money on building expensive erections. The shed contains three rows of cattle, with a passage between two of the rows. The boxes were 10 feet by 14, and the spars which separate the cattle are so arranged that they can be moved up as the manure thickens; as can also the feeding-boxes, which are fixed by screws with nuts. The roofing is in three divisions, with gutters—the wood is light, and all of home growth, and being sawn up by a saw-mill to the required sizes, little expense is incurred in the erection. The roof is flat tile—the same as is to be met with in the south of England, France, and elsewhere. They overlap one another the same as slates, and are virtually tile slates. About 40 cattle are here put up to feed.

At Danskin there is a herd of West Highland cows, which have had produce to shorthorn bulls. Those familiar with this cross must be aware of the very superior animals which are thus obtained. Both at Broadwoodside and Danskin, however, considerable accommodation would require to be provided before cattle could be fed with the greatest amount of profit, as both steadings are much exposed, and are not well adapted for the rearing or fattening of stock.

The principal drawback, however, which we observed to the obtaining of the greatest profit from the two farms, was the evident signs of the quantity of game which are preserved. The Marquis, however, is so far a farmer, that one of the plantations we observed was surrounded with a wire fence to keep in the hares and rabbits, no doubt to the very serious injury of the apparently thriving plantation around which this was placed. Whether the loss arising from the injury to the young trees, or the destruction of the crops, would be greatest, we cannot determine; but it is a curious fact that the Marquis is the only example we are aware of, in Great Britain, where an enlightened landlord, having such a decided taste for agriculture, has not become a non game-preserver. Lord Hatherton, Mr. Pusey, and others, are familiar examples of proprietors who became keen farmers, very soon discovering the incompatibility of game preserving and high cultivation. For agriculture must be regarded as more than a hobby with the Marquis—he has all along devoted a great deal of attention to it, and has expended much money, time, and labour upon its advancement. He has, we believe, contributed more to the funds of an agricultural society (the United East Lothian) than any other gentleman in the kingdom. Since the establishment of that society, in 1820, he has generally subscribed about £50 annually. We can speak from knowledge that he is one of the best judges of Leicester sheep in Scotland, and he has often acted as a judge both at the local and the Highland Society's shows. His success as an inventor of the tile machine, and the forming of the Tweeddale Tile Company, are matters of history, and the attention he has bestowed upon steam cultivation is familiar to many of our readers. We believe the Marquis commenced upon a wrong principle, a stationary instead of moving engine, and his steam-plough being now disused shows that he is himself satisfied of this. The judgment and spirit with which he entered upon the Yester improvements, and the perseverance with which he has followed out these and the more ordinary details of improved farming, entitle him to a high place as a practical agriculturist. The example he has set as to subsoiling and deep cultivation, will doubtless influence in time the practice of other districts. Already Sir John S. Forbes, of Fettercairn, has commenced a similar process of improved cultivation, and we believe with every success.

One of the most beneficial results obtained at Yester from the stirring of the soil is the great saving in labour. The green crop, turnip, is sown after one furrow, which is given in autumn. The land in spring is harrowed down, and afterwards ridged up, manure applied, and turnips sown. No grubbing in summer between the drills is practised, from the belief that the use of the grubber tends to consolidate the soil. The turnips, which we saw, and which were very superior, had been thus grown—the quantity of manure 16 cart-loads the Scotch acre, applied to the drill, and 3 cwt. of guano. Barley is generally taken after the turnip, with one furrow, and is sown as early in the summer as possible—last year, part in February—to prevent the over-luxuriance of the crop. The grass is generally depastured either one or two years, which is followed by a crop of oats with one furrow, which are also very full. Sometimes wheat is taken in place of barley or oats. After the cereal crop, a deep furrow is again given by four horses to stir up the soil. Farmers must not suppose that the employing of four horses to give this furrow entails double horse labour, as from the greater breadth of the furrow, about one-half more than that of an ordinary furrow, the four-horse plough overtakes as much as one-and-a-half two-horse ploughs; consequently the deep ploughing is performed at the expense of an additional horse per day. So much has the deep cultivation changed the character of the soil, that the Marquis now intends to reduce the number of horses kept, which, on the 1000 acres, amounts to 36 horses. But as a very considerable proportion of cartage in connection with the house and gardens at Yester requires to be performed by the farm horses, perhaps three or four horses should be deducted from this number, whose labour is expended elsewhere than upon the farm.

The Marquis has been undertaking a series of experiments as to the density of turnips, from the idea that turnips of the greatest density should contain the most nutriment, and that consequently this is an element in value in judging of individual turnips of any particular variety. Unfortunately, however, for the correctness of this theory, we observed that in the salt water bath in which the relative weights of the Swedish turnip were being tested, all those which were freely grown, large, round, and handsome, were comparatively lighter than the stunted, long-necked, and unthriven specimens. Had Dr. Anderson and other chemists, when they analyzed the turnips, determined the density of the constituent elements, which are only about 10 per cent., water excepted, we might have been in a position to have judged of this question; but it is necessary to bear in mind that in all turnips there are gases or air contained in the cells, and by the proportion of these, the density of the turnip is partly regulated. As the Marquis, however, is persevering with these experiments, it is quite possible that he may arrive at something definite.

As to the connection of deep cultivation with the increased fertility of the soil, the problem is beyond the present state of scientific agriculture. One influence, and it must be regarded as a highly important one, is, that the temperature of the soil by the deeper cultivation has been considerably raised, particularly during the winter, snow remaining for some days on portions not subsoiled, after it has entirely disappeared from those subsoiled. The Marquis has been experimenting for some time with thermometers placed at different depths, but we are not in a position to give the results. The allowing of the water more freely to descend into the soil, removing to a greater depth compounds of iron, &c., prejudicial to fertility, and the rain-water conveying, as it is now known to do, ammonia, carbonic acid, and nitric acid, there to form new combinations, and most probably to remain till taken up by the plant, in place as formerly of the rain water escaping by the furrows, and carrying away with it fertilizing ingredients—perhaps not the least important, the allowing of the oxygen of the air to so penetrate into the interstices of the soil as to break up the constituent elements of plants not in a form available for their assimilation, and thus increasing the amount of the organic as well as the inorganic elements of plants—also by allowing the rootlets of the plants to descend more freely and widely through the soil, owing to its increased friability and higher temperature, in search of food—these, with possibly other advantages (particularly we mention the early seeding of the soil in spring, hastening the period of maturity from two to four weeks, thus augmenting the produce and improving the quality) constitute some of the reasons why deep cultivation has been so pre-eminently successful on these farms; and if so, the same results should follow on soils of similar texture and composition.—North British Agriculturist.

THE ASSOCIATION FOR PROMOTING IMPROVEMENT IN THE DWELLINGS AND DOMESTIC CONDITION OF AGRICULTURAL LABOURERS IN SCOTLAND.

There are but few more attractive themes than "the improved condition of the labouring classes." There are none in which *ad captandum* generalities can be more safely indulged; while at the same time there are none so really susceptible of a practical application. The greatest effects must here once more trace back to the efforts of individuals. Every one of us, within the limit of his own circle, has a duty to fulfil, in looking to the state of the working man. And this, too, is no more a duty to him, than an act of justice to ourselves. Whatever the pursuit we may be engaged in, it must be a positive advantage and security to feel that those under us can go about what they have to do in comfort and content.

Necessarily confining ourselves to the case of the agricultural labourer, how many recipes and movements on his behalf do we hear or read of! The working-man should have free-trade in work, and be allowed to take his wares to the best market. The lower classes should be put beyond the reach of that temptation which now meets them at every turn on their path to or from their labour. What the people require above all is education: teach them self-reliance and respect, and so place them above the influence of that they now yield to. Do away with the law of settlement, pull down the beer-shops and build up schools in their places, and so effectually improve the condition of the agricultural labourer. This is what we hear, and have heard again and again. No one, either, will be bold enough to deny the excellence of the advice thus offered. But is this all? In what we find here is there included the first step, the very foundation of that improved condition it is our aim to accomplish? We are afraid not. The abolition of the law of settlement, the repeal of the malt tax, the systematic spread of education, are more or less general questions; while what we require, at least to begin with, is something a little more practically within the reach of us all. Let us try and see what this is.

In the natural instincts of an Englishman there is nothing more significant than his love of home. So long as he turns to his home with a relish—as the scene of his enjoyments and as his solace, he is safe. Our first care, then, should be to encourage this feeling within him, and to render that home capable of all the good of which it is susceptible. Strange however as it may sound, this, instead of being our first thought, is often enough our last. We parade before him all the domestic virtues, while we deny him a house to put them in. We conjure him to be temperate, when we drive him to the pot-house for those comforts we refuse him in his own. We preach self-respect and moral principle, while we suffer him to live on in a state that almost defies the observance of either one or the other. We are willing enough, to be sure, to go forth and fight great battles for him. We will harass the Legislature to relieve him from the ills he endures: we will arouse the public to join with us in some grand effort for his welfare. We will do this, and try that, though under our own daily observation we leave undone that without which all else must be inefficient.

We have been led to revert to this subject from a very striking example of the kind of neglect to which we allude. We have, indeed, before this, touched upon it; but we can do so now with the satisfaction of knowing the remedy is already in use. Only some year or so since the landed proprietors of Scotland were shocked to learn the condition of their own estates. Men who prided themselves on the improvements they were achieving, on the enlightened tenantry whose enterprise they were encouraging, pleaded at once guilty to the charge against them. Noblemen but too happy to take their friends on a round of inspection, to prove what agricultural advancement really was, still walked blindfold amongst their own people. In a country so remarkable for clanship, or that hereditary tie between the Laird and his dependants, the condition of the latter was found to be disgraceful. The labourers of Scotland were worse cared for than the beasts they tended. It was nobody's fault, simply because it was nobody's business. Landlord and tenant shifted it from one to the other; and so, while everything else was advancing, the bothy system continued just as bad as it had been.

It remained with a clergyman, the Reverend Harry Stuart, to denounce this evil; and it is only fair to add that no sooner did the landowners become aware of its existence than they hastened to offer all their aid to subdue it. The publication of Mr. Stuart's pamphlet led to a meeting in Edinburgh. This resulted in the formation of a society—"The Association for promoting Improvement in the Dwellings and Domestic Condition of Agricultural Labourers in Scotland." In the first annual report now before us we are told "the main object of the association more immediately concerns landlords;" while we learn further—as we see, indeed, pretty palpably in the list of subscribers—that "it is supported chiefly by them." From what we can gather, the movement appears to have begun well. An admirable discretion has been evinced in not attempting too much. Perhaps next to not doing anything for him, the labouring man has chiefly to fear that untutored zeal which does more than enough. We have examples at hand here, in England, of gentlemen who have shown the way with labourers' model cottages, that few have felt justified in attempting to imitate. The effect of this is self-evident; and the Scotch Society has very wisely avoided the risk of any so depressing an initiative. It does not even insist always upon new buildings, but depends much at first upon the better arrangement of many now in use. "To be practical and not speculative," is the motto the directors have selected to work under; and in furtherance of this, they have retained an architect, whose services are always available either at the office in Edinburgh, or on the estate of any member of the association who may wish to consult him. This gentleman, Mr. William Fowler, appends some very useful advice to the report just issued. Into this, however, it is not now our purpose to enter. In England, especially, we have no lack of essays and plans for building labourers' cottages—many undoubtedly more matured than those our northern friends can yet boast of. What we would the rather enforce is the moral of this movement. Have we no similar need here? Let each one of us look round, and answer for himself.

Just one word more. This matter, we are told, "more immediately concerns landlords." Admitted. But it concerns tenants too. Let us have no mistake on this point. It is, we must repeat, not only the duty of the farmer to his men, but to himself, to see them in comfortable homes. How many of the crimes of our agricultural population trace to this want! How many a loss and an injury may both owner and occupier debit to this cause! If, from man to man, we have any duties at all, this is one of the first.

SPRING PROSPECTS IN AGRICULTURE.

It is my privilege from time to time to address a few observations, through the columns of the *Mark Lane Express*, to the agricultural public, upon the many and varied topics connected with agriculture. In pursuance of this privilege I endeavour to keep a steady eye upon passing events and the prospective future, and, in the discharge of a pleasing duty, I endeavour to show the general course which it appears desirable to follow, in the conduct of the business of the farm, under every aspect and circumstance.

The past winter has been very severe and very protracted. It has caused much injury to both stock and crop. I wish, therefore, to call attention to our "spring prospects," as regards the state and condition and probable progress of our grazing stock, and the present state and future progress of our crops.

STOCK—CATTLE, SHEEP.—The high price of every kind of food has most unquestionably had a very detrimental effect upon farm stock. Cake, corn, hay, as also every kind of succulent food, have throughout the winter been unusually scarce and dear; consequently, all has been dealt out with a parsimonious, if not stingy hand; no waste or superfluous feeding allowed. The result is, that this, in conjunction with one of the longest and severest winters ever known, has left ordinary grazing stock lower in condition, and of course less able to feed or graze satisfactorily, than I have ever known. This danger is, I think, much increased by the vicissitudes they have already undergone, and the trying ordeal through which they are now passing and have yet to pass. Throughout the whole of last summer they suffered great privations, both from a deficiency of food and water, the one indigestible, the other unwholesome. Fatting stock became lean, store stock distressingly reduced to "nothing but skin and bone," to the no small injury to health and future progress. This has to be dealt with. To this add the further privations of a most trying winter; and then every grazier must see the difficulties his live stock have to encounter and overcome before he must look for any return of profit.

Now this is the point to which I desire to draw attention. What course must graziers pursue to restore to healthy condition, and promote the profitable progress of their grazing stock? Every grazier well knows the utter hopelessness of turning weak stock to feed upon "strong," or good and luxuriant pasturage. Scouring and debility immediately ensue, followed by death, unless they are changed or dry food is given; and similar results will take place on inferior pasturage, in a very growing or prolific season: so that in each case great caution is necessary. In fact, it is a difficult problem for graziers, how to graze from stock profitably. It applies equally to cattle and sheep: both alike are injuriously affected by too-luxuriant herbage, unless checked by other counteracting food. It does not, however, always follow that, because stock are poor, they are necessarily unhealthy. Hard and limited fare will make them poor; but if the food has been of a good and healthy kind, they will keep what is termed "heart-whole;" and, with ordinary care, these may speedily be restored.

Having said thus much, I would, without further remark, now state that my great object in this short paper is to urge upon every grazier the imperative necessity of a liberal outlay in those articles of food likely to give tone and stability to the stomach, and thus promote the more gradual and safe progress of the animal. I would most earnestly recommend resort to be had to those universal preventives and remedies in such cases—viz., cake, bean-meal, peas, oats, barley—and to which I would add not only hay, but straw of all kinds; indeed, any dry, strawy food that the stock will under such circumstances eat will be very serviceable to them. I believe this or similar modes of treatment to be indispensable to the well-being of the stock under existing circumstances; and I shall rejoice if my humble pen shall conduce to the prevention of great losses of stock and much individual suffering. In my own practice I shall adopt the above course, having already had a sufficient warning of approaching evil from the losses sustained by some of my neighbours.

CROPS—WHEAT.—This is the only crop of which I can at present take any notice, further than to say, that as every kind of spring corn has been put in after the best order, and the soil being in a highly satisfactory state to receive it, a good and abundant crop may be fairly anticipated. Not so with wheat. The long and severe winter, the continuous frosts without snow, or other remaining moisture (for the absence of rains during the summer and autumn left the soil dry, open, and light), has resulted in a very thin plant on all good soils, almost annihilation on elevated sands and gravels, and great injury to all light and thin soils. The whole crop throughout the kingdom has presented a dull, brown, deplorable appearance till within the past few weeks, and is but slowly recovering its growth and colour at the present time (April 10th) on the best soils, while in very many cases on other soils the crop is ploughed up and sown to barley, &c.

What course then should farmers pursue, to promote the progress of the crop? The first thing to be done is to aim at consolidation; but such is the dry, light, "frothy" condition of the land, as to render this an unusual task. The roller presses down the soil certainly, but it is the pressure of so much dust ready to be blown away, and this in many soils not in any way liable to such a visitation. Great loss has already been sustained on peaty and sandy soils. In the Fens the black dusty peat has been blown away, filling up the ditches, and accumulating in banks, like snowdrifts, to a great extent. The clod crusher is more effective in this respect, but the thinness of plant almost precludes the use of it, as it destroys more plants than the roller. However, these appliances must be used, and await the rains; pressure must be given, or the wheat plants will rise out of the soil, and die, as they did last year in America from precisely similar causes—long frosts without snow. Hoeing should, I think, be postponed till the soil becomes more adapted for it: to hoe in its present light, "ashy" state would add to the evil—would loosen it more and deeper. Hoeing should only be effected when the surface is somewhat compressed and run together, not when already too light, except it be done slightly for purposes of cleanliness. The great thing this season is to patiently wait, and watch every favourable opportunity, and then with every available force either by hand or horse-hoeing to get the whole completed. It is superfluous to say a word about weeding: every farmer would be extremely reprehensible to neglect that, in such a season.

A RAILWAY EXCURSION.

A railway glance at our provinces may not be unacceptable to the readers of the *Mark Lane Express* at the present season. The long severe winter, and consequent protracted state of vegetation, are giving rise to the liveliest apprehensions as to the state of the country. The food of both man and beast, it is feared, has seldom been seen in so precarious a condition at the beginning of April; while war and its consequences give an intensity of interest to these things which otherwise would not be felt: so that the inquiry, how far our agricultural resources are likely to meet the demands upon them, becomes a public question.

The productive resources of the country, we may at once observe in answer to this inquiry, are not in an unfavourable state, but the contrary; in other words, our report is not to be a gloomy one. Our readers, however apprehensive, must not expect from our pen, therefore, anything like despondency. At the same time, the picture has certainly two sides — the one gloomy in the extreme, but the other hopeful. Retrospectively, for example, we seldom or ever have seen the country between the English and Scotch capitals exhibiting such a uniform wintry appearance at this date; while prospectively we have as seldom seen the ground, young wheat, &c., &c., in a more favourable state for an early and abundant harvest, should the weather henceforth be propitious. An abundant harvest, however, is daily becoming more and more dependent upon the weather: but this is in the hands of a Bountiful Giver, and we must therefore hope for the best.

The period of our journey comprises six days. On the evening of the 3rd inst. we left King's-cross, per the 9 P.M. train, for Edinburgh, at which place we arrived at a quarter before 10 next morning (Wednesday). After doing business there, we left in the afternoon of that day for Montrose, where, and in its neighbourhood, we spent the two following days (Thursday and Friday). On Saturday we returned to the northern capital, where we heard three "thundering sermons" next day (Sunday), and on Monday morning left that place for the south, per the 8:30 A.M. train, arriving in London 9:15 P.M., and at home (Surrey) half-past eleven.

Part of our journey, it will thus be perceived, was performed under night, when nothing could be seen; going from home, for example, daylight broke in upon us at Newcastle, and in returning home, the carriage-lamps were lighted at Rugby; so that our observations extend only to some 570 miles through the counties of Northumberland, Berwick, Haddington, Edinburgh, Linlithgow, Stirling, Perth, Angus, Kincardine, Lanark, Dumfries, Cumberland, Westmoreland, Lancaster, Chester, Stafford, and Warwick.

The weather, upon the whole, was fine, though wintry cold. Tuesday night, like its predecessor, was frosty, the ground being covered with a foggy hoar-frost up to eight o'clock next morning. Throughout Wednesday the sun was powerful; but the wind cold and piercing in the shade. The temperature on Thursday was considerably higher in the northern extreme of Strathmore or "the great valley of Scotland," and on Friday morning a refreshing shower fell, followed by a mild growing April day, every stream we passed in travelling from Stonehaven *viâ* Bervie to Montrose being swollen by the melting of the snows still lying about the dyke and hedge-sides, and covering the mountains to a considerable depth. On Saturday it again became colder, and on Sunday morning snow fell, giving the Pentland Hills a clean shirt, so to speak. On the lowlands it did not lie where exposed to the sun; but on the above hills it was otherwise, and even on Arthur's Seat it indicated a very low temperature. Monday morning was milder, accompanied with April showers up to mid-day, when it became colder towards night.

The Highlands of Scotland are still deeply covered with snow, no doubt affecting the temperature. On the eastern range of the Grampian Hills, forming the northern barrier of Strathmore, through which the railway runs for about 80 miles, not so much as a black spot was to be seen, all the higher hills being covered to a great depth half-way down to their base; while below this level, and on the lower hills, every ravine and hollow appeared to be filled with drifted snow. Some distance before we got to Berwick, the remainder of the drifted snow made its appearance in hollows, and at hedge sides; and as we proceeded northwards this state of things grew worse and worse. We have heard of the snow being ploughed among some of our highland glens in order to make it thaw faster—and of the efficacy of the practice there cannot be a doubt; and although we saw nothing of this kind in our journey, yet frequent instances were to be seen of its lying in the furrows between ridges into which the seed was being put in an excellent tilth, thus proving the previous existence of a low, drying, and frosty temperature. In the valley of the Clyde, and onwards through Cumberland and Westmoreland, there did not appear to be the same quantity of snow as in Strathmore. At the same time vegetation was not in a more forward state; while arable lands were less favourably circumstanced for sowing.

We never, as already stated, recollect seeing vegetation in so uniform a state, there being scarcely any difference between north and south or east and west, everywhere the leaf presenting one unvaried frost-bitten appearance. This is, no doubt, accounted for from the severity of the past winter over the length and breadth of the land. When we left Surrey for the north, for instance, the grass-fields in front of our house were not more green than we found the "Links of Montrose." On our return again, we found vegetation had started: and so did the grass-fields of Strathmore on Friday the

6th instant. Which of the two are progressing the fastest we have not the means of knowing; but at the period of our journey the difference between them was scarcely perceptible. Ditto, we may briefly say of Berwick and Carlisle; no difference being distinguishable between vegetation in the two localities.

There are, no doubt, exceptions from these general observations, one of which we shall just notice. On returning to Montrose from Stonehaven we travelled *viâ* Bervie in order to examine one of the best-covered homesteads in the north, in the occupation of Mr. Jolly, Sillyflatt. Now, between Bervie and St. Cyrus the lands on the immediate sea-board are the exception to which we refer. Here young wheats and grasses (or seeds as we would term them) exhibit a healthy green colour, apparently either never having been frost-bitten during the late storm, or, if so, having entirely recovered before the date of our visit, at which time they were pushing forward vigorously. One large field of wheat, after a crop of beans, on the farm of Sillyflatt already mentioned, deserves special notice. Some cattle salesmen of the metropolis, who had previously visited their constituents in this locality, and other travellers in passing, had declared it to be the best example of the kind they had seen during the season; and we ourselves cannot withhold from it less favourable testimony.

The cause of the above exception appears to be this: The lands in question form a narrow strip of only a few fields in length along the sea-shore, either remarkably steep—"overhanging the sea," as it is said—or else forming terraces, each higher than the other, along the general slope. Behind, again, high rocky hills rise almost perpendicularly like a wall, sheltering them completely from north winds; consequently they are not only thus sheltered, but at the same time covered with the fresh sea air, perceptible to us and to every stranger who walks along the nature-formed terraces comprised within this exceptionary district. Now, the effect of this sea-breeze not only counteracts frost, but those sudden transitions so injurious to vegetation—indeed, the cause of frost-bitten leaves. Add to these things the fact that this is perhaps the most fertile and best-farmed district in the north, and its verdure at present is easily accounted for. What its farmers have always most to dread is a precocious spring—a calamity from which they have this season escaped.

We heard of some examples where wheat had suffered, but saw nothing worthy of complaint, but the contrary. From time immemorial it has been observed by farmers that the less wheat plants grow during winter the greater the prospects of harvest, and that there is nothing more calamitous to this crop than a forward state of growth in spring. We ourselves had never more abundant or earlier crops, for instance, than when the plants only appeared above-ground, remaining in that state until spring frosts had entirely disappeared. And the reason is obvious: because they are then in a healthier state to start, and consequently grow more vigorously afterwards. Every farmer must be familiar with this fact who has paid any attention to field phenomena. Now, however liable to error conclusions may be when made from a glance through the windows of a railway-carriage, we aver that a large proportion of the breadth of wheat which we saw was in this favourable position; so that, if fine mild growing weather sets in, the ground will soon be covered with a promising crop, and that the exceptions from this are altogether unimportant. It is possible that our southern provinces not seen are more seriously injured than those under notice; at the same time, we do not apprehend that losses will be generally felt, if the weather subsequently prove propitious.

The tops of turnips, where left in the field, in Berwickshire, the Lothians, and Stirlingshire, are very brown, and we fear that in some cases the bulbs are injured; but through Perthshire, Forfarshire, and Kincardineshire, vegetation was commencing, a proof to the contrary. On some fields above Johnshaven, being fed off with sheep, the tops were being cut with a scythe, and not before it was time.

Young grasses (ryegrass and clover) were in a very backward state. How far they have suffered from the long continuance of a severe winter, we are less able to give an opinion than on wheat; but immediately adjoining the railway we were unable to discover loss of plant, or any difference of colour further up the fields indicative of injury having been sustained. In returning to Edinburgh, on Saturday, *viâ* Perth and Stirling, a decided improvement was manifested in all fields of any fertility, especially where sheltered, since Wednesday, when we went north on the same line; and when we reflect on the proximity of the Grampians, covered with snow, and their influence on temperature, the wind blowing off them, ample reasons are found for concluding that plants are in a favourable state for rapid growth if warm mild weather were only realized. Through Lanark, Dumfries, Cumberland, and Westmoreland, the land is still too wet for rapid vegetation, the amount of evaporation carrying off the heat of the sun; but on well-drained fields young grasses also appeared willing to grow, and in some cases were assuming the lively green colour of the season.

Between Berwick and Stonehaven one and two-year-old ryegrass and clover fields are also in a very backward state. In these counties there is scarcely any meadow, almost the whole land being under aration. Between Lanark and Warwickshire, both inclusive, it is otherwise; there being a large extent of mountain pasture and meadow. Onwards to Lancaster, glens and fields still present a wintry appearance. Through Lancaster, Stafford, and Warwick, many fields were assuming an April verdure; while others had a lifeless brown colour, indicative of diversity of soil, management, and exposure.

To meet this unpropitious state of grass-lands, stackyards appeared to contain more than their usual supply of straw, and no doubt the whole will be required for live stock. Whether the housefeeding of stock during summer is on the increase in the counties through which we passed, we are unable to affirm, but rather think it is. Now as this practice requires an additional quantity of straw, the increase in stackyards may to a certain extent be thus accounted for, and not altogether from the superabundance of last year's crop. At the same time, farmers are now sensible of the value of this superabundance in their present exigency.

Ewes and their followers were everywhere in a starved state. Lambs were to be seen scattered abroad over the fields, apart from the ewes, busily nibbling the scanty herbage with their backs bent—anything but indicative of a prosperous state. Among them, there was none of that skipping and dancing so frequent at this season, when an abundant supply of milk is enjoyed. Among the hill sheep of Lanark and Dumfries, lambing was only about commencing, and shepherds were consequently anxiously looking for a change of weather. One respectable farmer accompanied us between two stations in the former district, and gave us an interesting account of both sheep and cattle, stating that though both had endured a good deal of privation, they were nevertheless accustomed to it, and only required a week's fine weather to get over it!

Fattening sheep on turnips were in better circumstances. That they had suffered during the long storm need not be doubted; but when we saw them, they were obviously doing well. Those above Johnshaven were apparently good mutton. Two drills were being removed for indoor feeding, and two consumed on the field, on the old plan—by the latter, the sheep scooping out the turnips rooted in the ground.

We need hardly say, in conclusion, that farmers were everywhere busy preparing the land and getting in seed. In elevated and wet districts, labour appeared behind, but not so far as we expected to find it, while the utmost was being made of the long days to advance it. We hope in a subsequent article to notice the covered homesteads of the north, and perhaps a second on the lack of turnip cutters, and sowing machines for corn and artificial manure. In passing along her Majesty's highway, at St. Cyrus, an industrious sower guanofied our broad cloth as brown as the back of a fox, before we got within 100 yards of him! On the former topic, we shall have to give our northern neighbours credit for mechanical progress; but on the latter, all we shall say at present is, that we shall endeavour to induce them to visit Carlisle in July, and judge for themselves.

ON PEAT AND OTHER VEGETABLE CHARCOAL, AND SOME OF ITS USES.

By William Longmaid.

The subject to which I propose to direct your attention this evening is Charcoal, and some of its uses. The materials forming the earth's surface have been described by geologists and chemists, as consisting of comparatively a few simple substances; and their distribution and uses instructively and beautifully illustrate the power, the wisdom, and the goodness of the Almighty Creator, and furnish unlimited evidence of design.

Of undecomposed substances, probably there is no one that plays more important and varied parts than carbon; if we contemplate the diamond that beautifies the diadem of royalty, the still more beautiful electric light, or the vast deposits of coal, so extensively distributed in this favoured island, carbon must be regarded as an agent of primary importance.

If we extend our researches to organic beings, we find that with the exception of the framework of animals and the shells of crustacea, carbon forms a moiety of the solid materials of all organic beings, whether animal or vegetable; the beautiful flowers and foliage that adorn the earth, the colours that deck the plumage of the feathered tribes, no less than the tints that clothe the inhabitants of the teeming oceans and rivers, the fragrant perfume wafted on the gentle breeze, all owe their existence in part to carbon; nay, even some of the solid rocks that form the framework of the great globe itself, are compounded in part of this substance.

However varied in form, and widely-diffused carbon may be in nature, in its countless combinations, it is no less useful in the arts, sciences, and manufactures; indeed, we trace its effects everywhere; in fact, if carbon were to be withdrawn from the earth, organic existence would cease, and the physical condition of the earth itself would be changed.

It may not be amiss, then, to devote a few minutes this evening to the consideration of carbon, in some of its forms and uses, as it is found in the arts and manufactures, particularly under the term vegetable charcoal, the produce of wood and peat.

Charcoal produced from vegetable matter is carbon isolated from the constituents of water, with which it is always combined in organic substances; there are several methods ordinarily employed for this purpose; one in considerable use is most rude, and no doubt of great antiquity; it consists in digging a pit in the earth, and piling up pieces of wood or peat in large heaps, which are covered with clods of earth in such a manner that the pile may be ignited at the base; when the fire is well kindled, more clods are placed over the pile, in order to prevent the too free access of atmospheric air, and which is eventually excluded; the heap is allowed to stand from one to five or six weeks, the length of time depending on the size of the operation. Another method is much practised in some parts of the Continent, and consists of a furnace somewhat in the form of a kiln, with apparatus to exclude the air; it is filled with the material ignited at the base, and the operation proceeds much in the same manner as before described. Modern science has provided a more perfect operation in destructive distillation in retorts, whereby the volatile products are condensed and are of great practical utility.

In the first method I have described, about 18 lbs. of charcoal are obtained from every 100 lbs. of dry wood; this is considered a fair yield; the other products are mostly lost. In the second method more tar and pitch are obtained with the same quantity of charcoal. But by the more elaborate process of distillation, naphtha, acetic acid, ammonia, and other matters, are obtained, together with about 20 to 25 lbs. of charcoal for every hundred pounds of wood.

There is yet a more recent process for the manufacture of vegetable charcoal, for which, jointly with my son, I have obtained letters patent; this process consists in steeping vegetable matter in dilute sulphuric acid, and drying it at a low temperature, whereby we obtain from 40lbs. to 65lbs. of charcoal for every 100lbs. of dry material submitted to the operation.

I presume the experiment I am about to make with sulphuric acid and sugar has been exhibited in every lecture room in the United Kingdom; this demonstrates the principle of the new mode of manufacturing charcoal; the sulphuric acid has a greater affinity for the elements of water than carbon, and the latter is isolated. We have found that every description of vegetable matter to which we have applied this mode of treatment has exhibited the same phenomena.

The chemical action that takes place is well understood, and presents no novelty; but the application of this principle to useful purposes, on a large scale, I believe has not before been accomplished. This experiment will demonstrate the nature of the process: This is sawdust of pine timber, and has been steeped in sulphuric acid of the strength of 3 degrees of Twaddle's hydrometer. I will now place it on this plate, and apply a lamp underneath—we shall soon see the result.

Perhaps it is impossible to over-estimate the importance of charcoal. England is possessed of vast deposits of mineral coal, which enables our manufacturers to produce iron at a cost that bids defiance to all competition. The deposits of coal and iron-stone may be regarded as the foundation of all our greatness as a nation; but whilst the iron is produced in quantities of which the mind can scarcely conceive an adequate idea, and whilst it is of a quality fitted for an endless variety of purposes, for which strength and cheapness are the prime qualifications, it is totally unfit for the manufacture of steel. This circumstance renders this country dependent on foreign countries—chiefly Russia and Sweden—for iron of superior quality. The sole cause of the superiority of foreign iron is the fact that charcoal is the fuel employed for smelting the ore.

The coke used by the British smelter contains a sensible amount of sulphur, chiefly in combination with iron, and exists in the coal in the form of iron pyrites; it is found practically impossible, in the great operation of iron smelting, to separate it at a cost that would render it practicable.

On the other hand, charcoal is all but absolutely free from sulphur, and it exists in vegetable matter in the condition of sulphuric acid, and combined with alkali, thus forming a neutral salt, which combines with the earthy matters of the ore, and thus forms an ingredient of the slag. If from any unforeseen circumstance our supplies of foreign iron should cease, our steel and cutlery manufacturers would be driven to great extremity, and this branch of British industry, of world-wide reputation, would be in danger of considerable derangement.

There are other branches of manufacture dependent on charcoal for their success—gunpowder and tin-plates; it is also largely used by founders and engineers, and more recently it has been used as a deodoriser, disinfecter, and decoloriser, and also as a manure.

A cursory glance at the position and limited surface of England, with its dense and increasing population, will be sufficient to convince us that space cannot be spared for the growth of timber for fuel; this will be still more evident, if we consider for a moment the consumption of coals in the metropolitan district for the year 1854, which amounted to 3,400,000 tons. The quantity of wood necessary to produce charcoal of equal heating power, would exceed 400,000,000 cubic feet. If we add to the quantity required for London, the quantity required for the consumption of the country and for exportation, we shall find that the entire surface of Great Britain would be inadequate to grow timber sufficient to manufacture charcoal of equal heating power. Whilst this is undoubtedly the case, and with an ever-increasing demand for fuel, attention has been directed to the *bogs* of the United Kingdom, as offering an exhaustless mass of organic matter, ready to be converted by the hand of science into fuel of first-rate quality, eminently suited for most of our manufacturing and domestic purposes.

The extent of bog land in Ireland alone exceeds 3,000,000 acres in surface, in many localities ascertained to be of a depth of 30 feet and upwards.

It is well known that peat charcoal, when employed as fuel for smelting iron and tempering edge tools, &c., has produced articles of surpassing excellence; it is largely used on the Continent in smelting works, and for domestic purposes.

Peat is vegetable matter undergoing partial decomposition, and probably its formation commenced at a very remote period of the world's history. It is found in natural basins, formed by the inequalities of the earth's surface, wherein the water is dammed up and prevented from flowing into adjacent streams and rivers. In these lakes vegetable matter has accumulated and is undergoing various changes, and final decomposition. In the earlier deposits it is characterised by a nearly homogeneous structure; but the latter and more superficial deposits present a less decomposed and compacted character, and has the general appearance of an entangled or felted structure, composed of partially decomposed moss and grass, and not unfrequently shrubs and trees; the moss and grass have the appearance of gradual and successive decomposition at the roots, whilst they continue a vigorous vegetation at the surface.

The entire mass, both of the more compact and the less solid peat, is composed chiefly of ligneous matter, and may be considered as analogous to woody fibre; its quality, however, is frequently affected by the special circumstances of locality. The best samples we have met with have contained, when dried, about 70 to 75 per cent. of carbon, but other samples were contaminated with earthy matters to the extent of 5 to 10 per cent. The average impurities may be taken at 4 to 5 per cent., and we have found some samples of peat charcoal yielding 94 per cent. of fuel.

The attention of the scientific world is now fully awakened to the importance of rendering this vast source of wealth available; not that the coal fields of Great Britain are likely soon to be exhausted, notwithstanding the millions upon millions of tons raised annually; but as a matter of economy in the race of the arts, manufactures, and civilisation, it is of first importance to get the greatest possible amount of good at the lowest possible cost. What, then, is the present state of the fuel market? The demand for coke and coals for locomotives, for marine engines, for exportation and other purposes, is so enormous that the price has been raised to such an extent as to threaten the destruction of extensive industrial operations carried on, on the Tyne and in other coal districts. Immense quantities of coke are being sent to the extremities of Great Britain and Ireland for working the locomotives of the railways, whilst many of the lines traverse vast tracts of bog capable of being made into fuel, equal in value to coke, and in such localities at a third of its cost.

There is another remarkable feature which may be noticed. Ironstone is at this moment being raised in the immediate vicinity of deposits of peat; but in the absence of any economical carbonising process, to render it fit for smelting iron, the ore has to be sent to smelting works, at a considerable charge for carriage. It is a remarkable fact that ironstone is found constantly occurring in the vicinity of deposits of peat, and when once this treasure is brought fairly to bear, we may anticipate the production of iron of the finest quality.

It may be truly affirmed of Ireland that she contains within her borders all the raw material, except cheap fuel, to make her a worthy competitor of Great Britain as a manufacturing country; and if once a cheap and practical method be devised of rendering the peat into good charcoal, I can see no end to the prosperity of that country; abounding, as it does, in rich deposits of iron, copper, lead, and sulphur ores in unlimited quantities, together with rock-salt, clay, limestone, slates, and granite, having also fine lakes and rivers, the rude materials that form the foundation of a nation's greatness as a manufacturing people. In addition to the mineral deposits, Ireland possesses in her hardy sons the bone and muscle and the energy necessary to raise her to the first rank as a manufacturing nation; and I do not despair of seeing the peat-bog in course of transformation into charcoal, and her idle population become industrious and prosperous manufacturers. I venture to predict that, when the manufacturing capabilities of that country, so rich in native, and at present unappreciated materials, become fully known, capital will flow readily to her aid. But as long as Irish manufacturers have to draw their chief supplies of coal and coke from England and Scotland, her manufactures must languish, and so long will her vast mineral treasures remain undeveloped, and her population be without profitable employment.

The question may arise, Why is the iron produced by vegetable charcoal of better quality than that by mineral coke? The answer is obvious: iron has an intense affinity for sulphur, and mineral coal contains iron pyrites, a portion of the sulphur of which remains with, and injures the texture of the metal smelted by its agency, and renders it unfit for the manufacture of steel; as it is impossible, except at an enormous cost, when once the sulphur has combined with the iron, to make a perfect separation.

Vegetable charcoal also contains some sulphur, but in all cases in a neutral form, combined with potash, soda, or other alkaline re-agents; in this condition it readily combines with the earthy matters of the ore, and forms an ingredient of the slag. The peat-charcoal we propose to manufacture also contains sulphur, chiefly in the neutral state, as alkaline salts; but a small portion also remains as free acid. In smelting operations the alkaline sulphates combine with the earthy matters of the ore, forming slag, and the free sulphuric acid is decomposed. One atom of the oxygen of the acid combines with an atom of carbon, forming carbonic oxide, and liberating the remaining oxygen and the sulphur as sulphurous acid; thus all the sulphur of the free sulphuric acid is evolved into the atmosphere.

In pit-coal the sulphur exists in varying quantities from one to fifteen per cent. When it exists in larger quantity than two to three per cent. it renders the coal unfit for many manufacturing purposes.

There is another quality of fuel of great importance—its heating power. The following is an extract from Dr. Ure's work, and may be regarded as the mean results of numerous experiments made by that gentleman. It gives the quantity of water raised from the freezing to the boiling point, and the quantity of water of the temperature of 212°, evaporated by the combustion of one pound of fuel in each case:—

	Pounds of water raised from 32 to 212 degrees. lbs.		Water at 212° evaporated.
Perfectly dry wood	35	..	6·36
Wood in its ordinary state .	26	..	4·72
Do. charcoal	73	..	13·27
Pit-coal	60	..	10·90
Coke	65	..	11·81
Peat	30	..	5·45
Peat-charcoal	64	..	11·63

It will be seen from the above table that wood-charcoal stands first in heating power, coke second, and peat-charcoal within 1·3 per cent. equal to coke.

Charcoal has also the peculiar faculty of absorbing watery vapour and gases to an extraordinary extent. Professor Liebig states the result of experiments conducted by Saussure, that one volume of charcoal in 24 to 36 hours absorbed 90 volumes of ammoniacal gas, 65 sulphurous acid, and 55 of sulphuretted hydrogen. It also absorbs nitrogen and many other gases. This property of charcoal has of late been turned to practical account, as it has been used as a disinfector and deodoriser, some interesting particulars of which will be found in a paper read to this society by Dr. Stenhouse, in the early part of last year. Since that period experiments have been made by Mr. Barford, at Bartholomew's Hospital. The particulars were published in the *Lancet* a few weeks since. The writer, after describing the substances possessing the property of deodorising and disinfecting, and the chemical action on which they respectively depend, and also pointing out their several defects, adds, that they are all open to serious objections; but the one which practically will be found the most effectual, I believe, has received the least patronage. This is charcoal, a body whose disinfecting powers have long been known, but its mode of application has been quite neglected.

A most perfect trial has been made in the dissecting-rooms of St. Bartholomew's Hospital, which must abound in noxious gases and putrescent odours. On thoroughly heating the charcoal and placing it in shallow vessels about the rooms, it acted so promptly, that in ten minutes not the least diffused smell could be detected. So quick and effectual was its action, that arrangements have been made for its constant use. As a purifier of hospital wards, both civil and military, it might be applied with great advantage, saving patients from the unpleasant smells and effluvia from gangrenous wounds: thus the patient himself and those in adjacent beds would not be subjected to the influence of putrescent odours. All these the charcoal would effectually absorb. Charcoal is more efficacious than any other disinfectant when applied in the manner described, absorbing gases of every kind. It does not require the presence of any other substance to assist its action, but without stint or scruple collects noxious vapours from every source, not disguising, but condensing and oxydising the most offensive gases and poisonous effluvia, converting them into simple, inert, stable compounds. It is easy of application, and is economical, comes within the reach of the poorest, and can be safely placed in the hands of the most ignorant, thus combining advantages not possessed by any other disinfectant.

Mr. Barford also described a process for purifying the charcoal, so as to renew its powers; but this need not be practised, for the charcoal after being used in the hospitals is more valuable as a manure, by reason of the gases it has absorbed; thus its use need not entail any expense on such establishments. This brings us to the consideration of charcoal as a manure, for which purpose it is likely to become an important agent, especially from the circumstance of its possessing such intense affinity for nitrogenous gases and aqueous vapour.

Professor Liebig states that the peat and spent bark are most difficult forms of organic matter to deal with as manure; that peaty matter remains for years exposed to the influence of air and water without undergoing change, and in this state yields little or no nutriment to plants. Recent experience has, however, shown that when organic matters — such as peat and spent tan — are converted into charcoal, they become exceedingly valuable as vehicles for the transmission of water, nitrogenous compounds, carbonic acid, &c., to the plants, first separating these matters from the atmosphere, and again yielding them up when required.

The mode of applying charcoal as manure is simple: it should be ground to a coarse powder, and then strewn over farm-yards manure heaps, stables, cow-houses, pig-styes, cesspools, or placed in manure tanks, urinals, &c.

It is suitable for being applied, also, without mixture by the drill or broad-cast, in the proportion of 4 to 7 cwt. per acre, to all green and corn crops, and will be found a valuable addition to most soils, especially those which are composed of clay.

Perhaps I may be permitted to make a short digression, for the purpose of introducing to your notice another preparation of peat; this is peat manure, produced by steeping the peat fresh from the bog in a solution of caustic alkali; it is then dried and ground.

Contrary to the general opinion of writers on agricultural chemistry, that the atmosphere and water are the sources from whence vegetables derive their carbon, I entertain the opinion that they would at all times take up a large proportion of their carbon by the roots, whenever it is presented in soluble compounds, such as organic matters, dissolved by means of alkalies, in which condition it has been found, by actual experiment, that growing plants do take up and assimilate the carbon of such compounds, when they are applied in a suitable form.

In the substance I have now the honour of submitting to your notice a very large portion of the inert peaty matter, described by Liebig, as being so difficult of treatment and slow of change, is rendered soluble by the process I have described; not only so, but the remaining organic matters are in a condition to undergo rapid change. We have in this powder from 50 to 60 per cent. of organic matter combined with salts of soda, and nitrogenous compounds soluble in water; this, surely, cannot fail to become a most important addition to our list of artificial manures. Sea-weed treated in the same manner yields still more remarkable results.

Trusting to be excused for this digression, I will return to the subject of charcoal. Some of the sawdust charcoal, of which a sample is on the table, has been manufactured into gunpowder of very fine quality; but, strange to say, there is little probability of its being generally used by powder manufacturers. With one honourable exception, all those whose attention I have called to this article have declined to use it, or to adopt sawdust as a material for the manufacture of charcoal. One firm informed me that they never introduce any novelty until it has been fully approved by the Government; another used only elder; others restrict themselves to oak, willow, or dog-wood for the manufacture of charcoal, each firm enjoying the opinion that no other wood is fit for making powder of superior quality but the special kind they individually use; and then, why should they make any alteration, for their fathers and grandfathers did the same before them. This will serve to show the difficulty that sometimes exists in introducing novelties, and getting them adopted by established manufacturers.

In conclusion, I trust I have furnished you with some points for discussion, which I consider the principal object of this paper.

Should it be my lot, in the ordering of an All-wise Providence, to be made the humble instrument of developing the resources of our bogs and other unapplied and unappreciated products, to assist in raising the people of Ireland to a just appreciation of the vast mines of wealth that abound in their favoured land, it will be a source of satisfaction to me to the latest period of my life, independent of any pecuniary advantage I may derive.

READING FARMERS' CLUB.

A very full attendance of members assembled on Saturday week, in the the new Club-room, to hear a lecture from Mr. Baker, of Writtle, Essex, on "Farmers' Clubs," of which we can only give a condensed report.

Among those present were, R. Gibson, Esq., in the Chair, Mr. G. Shackel, Mr. J. Stratton, Mr. Hibberd, Mr. Young, Mr. M. Sutton, Mr. Kidgell, Mr. Hicks, Mr. Parsons, Mr. R. Lovegrove, Mr. T. Harris, &c., &c.

After a few introductory observations, the Chairman introduced

Mr. Baker, who said—Agriculture in its widest sense comprehended all departments of knowledge and science within its boundaries. From the earliest ages it was esteemed not only a useful, but a noble employment. The greatest and best of mankind had looked upon it as a retreat upon which they could fall back after the anxious toils of ambition had frittered away the best portion of their lives. Poets had idolized it as a pursuit in which happiness might be found, if anywhere her residence was placed upon earth. He would not dwell upon those rustic pleasures which it needed a poet's eye to depict, but consider agriculture in its broadest sense, and treat it, as it was, as the first in usefulness, and, in reality, the best of all the various pursuits man was ordained by nature to fulfil, and in the prosecution of which every one must confess that all the energy and talent that could be bestowed upon it would but open a field for further exertion. Every foot they advanced became the stepping-stone to others that were to follow: as they proceeded, the plain wider and wider expanded, until at last that which appeared as bounding the horizon of their view was left behind, and a plain interminable extended before them, beyond the ken of the most penetrating eye, and the possibility of being reached by the sturdiest and most ardent pedestrian. It might, however, be well to halt upon their path, and, by looking back, endeavour to define how far they had advanced. What was agriculture at the commencement of the present century, and what was it at that moment? There were those who would recollect long within that period, that if they had been told that a small bag of dried earth, that might easily be carried, would fully manure an acre of ground, they would not only have treated the statement as unworthy of credit, but as fabulous in the extreme. Yet this had come to pass, and guano was now brought to this country by shiploads, and the money annually paid for it would purchase a German state. Saltpetre forsook its vile office in the "stuff called gunpowder," and became one of the greatest adjuncts towards the production of the food of man. Nor did the inquiry stop with these discoveries. They had merely stimulated the human mind to activity. Science had expanded with practice, and the result was becoming more and more appreciated. Chemistry, geology, mechanics, hydraulics, meteorology, entomology, botany, all contributed their share; nor was there a science, however remote it might appear, that did not contribute its stores of knowledge for the advancement of agriculture. It might be said that the various systems of agriculture, and the facts to be elicited, were well-nigh exhausted by the investigations that had been going on; but if there was any truth in such an opinion, it might have been urged 50 years ago, equally as well as now. On the contrary, he believed that the path was but opened to them—not explored; and therefore the pursuit of knowledge was as requisite now as heretofore. He might be allowed to inquire whether the system of leasing or letting land was perfect, or incapable of improvement? Was the present pernicious system to be pursued, of giving the yearly tenant no interest in the capital he might invest for the improvement of his land, beyond a six months' occupation after he had received a notice to quit? Was the present system of leases to be maintained—containing covenants totally at variance with the interests both of landlords and tenants? Was it nothing that buildings, erected by the tenant for the purpose of enabling him better to carry out the processes of the farm, were upon his quitting to remain the property of the landlord, without even the slightest compensation? Was the present pernicious system of leasing land, whereby the tenant improved the farm the first period of his term, to exhaust it again in the last, the best that could be devised both for the landlord and tenant, as well as for the community at large? Was the present mode of assessing land upon the best principle, whereby a tenant was from year to year compelled to pay a larger quota, just in proportion as he invested his capital, or took up the surplus labour of his district? Were the taxes upon him equitable? Was he to be subject to free competition with the whole world in the production of barley, and be subjected to an impost upon his own production beyond its actual value, if he were desirous of converting it into malt? Was the condition of the labourer such as required no improvement? Was his cottage accommodation such as he required or deserved? Could there be no improvement in the mode by which he might obtain the first necessaries of life—bread, milk, meat, and home-brewed beer? Was the economy of the farms perfect? Were the steadings adequate to the wants of the tenants? Were the fields so arranged as to enable him to cultivate them to the greatest advantage? Were there no better modes of feeding cart-horses or cattle than those pursued? Were they decided on the best and most economical method of applying manure? Were covered houses better than open sheds? or was box feeding better than either? Did they understand the best mode of applying artificial manure? and was chemistry sufficiently understood to enable them to decide upon its quality? Were they sufficiently acquainted with entomology and botany to trace the true causes of disease in plants and vegetables? Was geology sufficiently understood to enable them to cultivate the surface to the best advantage, by bringing the subsoil more or less into consideration? He would not proceed further, leaving them to consider whether these queries could be answered affirmatively and practically. If they thought any of them worthy of investigation, then he had established the principle that farmers' clubs were beneficial, and that their utility might be still further increased by their extension and support. But they had to look forward to a new order of things. The power of steam, for the purposes of thrashing, crushing, grinding, and cutting, was already available. Might they not also expect that for ploughing, digging, harrowing, and scarifying, it would ere long be equally applicable? But, inasmuch as it seemed a power capable of dealing with districts rather than farms, it would become them hereafter to engage its power collectively rather than individually; and how could it be so easily and effectively brought into action as by the combined influence of the members of a Farmers' Club?

Votes of thanks to the Chairman and Mr. Baker were then passed, and the meeting separated.

AGRICULTURAL STATISTICS FOR SCOTLAND.

We understand that at a meeting of the enumerators connected with the Agricultural Statistics for Scotland, held in the Society's Hall last Tuesday, various suggestions were made as to the collecting of these. We understand, however, that on some points there is at present an intention to make a backward movement rather than one in advance. Of these one of the most important is that woods shall be excluded. The comparative failure in the collecting of these last year may have led to this; but the inattention on the part of proprietors or those acting for them, could surely be overcome. The influence of public opinion would soon compel the most inattentive to make an endeavour to furnish the information required. The excuse made that proprietors and tenants do not know the extent under wood, deer forests, and sheep walks will not avail. Where Highland estates are advertised for sale, or when deer forests or shooting over sheep walks are in the market, the extent is generally given, or an approximation to it. If it is found convenient and profitable to furnish intending purchasers, sportsmen, and others with the information, it is certainly not less a duty to furnish similar details for the Statistical Returns.

Last year, the extent under deer forests and sheep walks was comprised under one head. Now this, we think, should be rectified in future. The red deer will not remain on sheep walks, and, as they cannot be identified and claimed as property like sheep and occasionally change their locality—sometimes of their own impulse, and not unfrequently by the arts used by gamekeepers—it is surely important for the country to know the relative extent under sheep walks, deer-forests, and mountain grazing for cattle. Without such distinctions, a very false estimate of the value of the Highlands for the maintaining of stock is certain to be made. The extent under deer forests at present may be estimated at something like two or three millions, and is yearly rapidly extending. It is therefore obvious that, without such a distinction, the value of the Statistics as to the department of live stock, especially Highland cattle and sheep, with reference to the amount of land thus occupied, must be rendered nugatory. The number of deer maintained, and the number slaughtered, with their value as food, cannot probably be ascertained. The value of haunches of deer in London we have generally observed to be under that of South Down mutton, the difference being about 2d. per lb. The same estimate may be taken as to their relative value with Highland Black-faced. As yet, the agricultural world is ignorant as to the relative value of red deer and sheep as producers of animal food. In a domain on the south of Scotland, it was ascertained that fallow deer, as producers of flesh, weight for weight with sheep, were greatly inferior, and the rent derived was under one-half that yielded by sheep. This led to a restricting of the number of deer, and extending that of sheep. Probably the same would hold even more decidedly in the case of red deer, which are much less in size and of more restless habits than the fallow deer.

Last season no attempts were made to collect the returns for crofts. As the land thus occupied is very considerable, this should also be embraced. In France the great proportion of the soil is occupied by small proprietors and farmers, and were they not taken into the estimate, a very false idea of French agriculture would be given. We may also state in reference to woods, that the area thus occupied in France is between one-sixth and one-seventh of the whole, the area of France being about 130 millions of acres.

The number of horses and cows in towns should also be included. The number of both of these, the former in the consumption of grain, and the latter in the production of milk-produce, is important in an economic view. Besides, farmers, furnishing the number of cattle and sheep, could also furnish the ages, breeds, and in the case of sheep, the weight of fleece.

There are several other points which might, we think, be taken into the Agricultural Statistics. In addition to what was collected last year, the United States include the extent "of improved and unimproved land, working oxen, corn, maize, buckwheat, butter, cheese, wool, hay, cloverseed, other grass seed, flax seed, animals slaughtered, honey and bees wax, besides other articles, such as maple sugar and molasses, domestic fabrics, population, &c." Some of these might, we think, be taken in this country with advantage.

What would also be a very decided improvement for the securing of more correct returns, would be, that an enumerator for each district or county should have the schedules first forwarded to him, so that he might have any apparent mistake corrected, and also furnish information to parties ignorant as to the requirements of the schedules. This is the more important, as we have understood that last season considerable dissatisfation was felt by enumerators at their not having the opportunity of correcting errors, partly intentional and partly unintentional, of those making returns.

The question will naturally occur to many whether it is advisable to have annual, quinquennial or decennial statistics. For agricultural purposes, either of the two latter might be deemed sufficient—for political economy purposes, a yearly return is at present deemed advisable. There is another question, should it be made compulsory, such as collecting the census of the population. As the Scottish farmers, at least, have shown that they are willing to furnish all without any compulsory enactment, this question as regards Scotland may be regarded as settled in favour of voluntary returns. As to England, it would be considered as an unwarrantable interference of Government, and, with the delicate relationship subsisting there between landlord and tenant, this feeling would be more strongly called into operation, and a systematic and determined opposition to Statistics would most probably be engendered. After a few years of success in Scotland, the English farmer will perceive that his interests will not suffer by furnishing such information as is required in the statistics. But in England as much as in Scotland, the farmers should be left as much to themselves as possible, and not interfered with beyond pointing out and suggesting what is desirable.

It should be arranged that the schedules should be sooner issued, and the returns made by the beginning of November.

SEPTENNIAL TITHE COMMUTATION AVERAGES.

SIR,—In *The Mark Lane Express* of the 15th January, you published a letter from me, stating the value of each £100 of tithe commutation rent-charge for the year 1855 to be £89 15s. 8¾d., founded on the septennial average prices published in the *London Gazette* of the 5th January last, viz.—

	s.	d.	
Wheat..........	6	0¾	per imperial bushel.
Barley..........	3	7¾	„
Oats............	2	6	„

The perfect accuracy of this statement I now beg to confirm, for the satisfaction of your readers, as it has been called in question, in a letter published in the *Record* of the 26th ult., signed by the Rev. W. M. Hind, of Stapenhill vicarage, Burton-on-Trent, who states that by a strict valuation, the septennial average prices should be, for

Wheat......	6	0 47-56	per imperial bushel.
Barley......	3	7 27-28	„
Oats........	2	6 8-14	„

making in the valuation of £100 of rent-charge a difference of 8s. 0½d. The Rev. W. M. Hind, in his letter, alludes to this difference as an error of computation; whereas the difference is really in the septennial average prices, over which the authority of Parliament alone has control. The omission of small decimal quantities in the average prices from time to time during the seven years of the fractional parts of a farthing in the price per bushel, clearly tends to diminish the valuation of the rent-charge; but the annexed clauses of the Tithe Commutation Act will, no doubt, satisfy your readers that I had no alternative but to take the prices as published in the *London Gazette*, as the basis of my annual tables.—I remain, sir, your obedient,

CHARLES M. WILLICH, Actuary,

25, Suffolk-street, Pall-mall, University Life Office.
April 5, 1855.

Tithe Commutation Act, 6 and 7 Wm. IV., c. 71.

Clause 56. "And be it enacted that, immediately after the passing of this act, and also in the month of January in every year, the Comptroller of Corn Returns for the time being, or such other person as may from time to time be in that behalf authorised by the Privy Council, shall cause an advertisement to be inserted in the *London Gazette*, stating what has been, during seven years ending on the Thursday next before Christmas Day then next preceding, the average price of an imperial bushel of British wheat, barley, and oats, computed from the weekly averages of the corn returns."

Clause 67. * * * "and every first day of January the sum of money thenceforth payable in respect of such rent-charge shall vary so as always to consist of the price of the same number of bushels and decimal parts of bushels of wheat, barley, and oats respectively, according to the prices ascertained by the then preceding advertisement;" * * .

ROYAL DUBLIN SOCIETY'S CATTLE SHOW.

The spring show of the Royal Dublin Society, which opened to the public on Tuesday, may be truly said to have been most successful, and in every particular fully sustaining the high character of the society, and exhibiting some very marked improvements over former years. Tuesday was, as usual, devoted exclusively to the judges. The supply of horned stock was exceedingly fine, especially in the class of bulls, which probably never was better represented, either in numbers or quality, than on the present occasion. There were in the class of shorthorned bulls no less than 160 bulls entered, all of which were remarkable for their evident high breeding, perfect symmetry, and splendid condition. Of the whole number, 101 were yearlings, which certainly formed not the least interesting feature in the exhibition.

In the class of bulls calved prior to 1852, there were some most magnificent animals, many of which will be recognized as having carried away prizes at former shows. The classes of heifers and milch cows were also very superior, the entries being very numerous, and the animals of first-class merit. Fat cows and heifers were also well represented, and comprised some very beautiful animals.

The show of sheep and swine was not so large as could be desired. There was, however, a fair average number, and the quality in both departments exceedingly superior. In the former class there were a number of very fine long-woolled Leicesters, exhibited by Mr. Reynell, Lord Talbot de Malahide, C. P. Leslie, M.P., Colonel White, Mr. La Touche, of Harristown, Mr. Lambert, of Beaupark, &c., which were well worthy attention. We observed a pen of three hogget rams of Mr. Reynell's, which were remarkably fine. Charles Tottenham, Esq, Woodstock, had a pen of very fine South Down ewes, bred by Prince Albert, with their lambs, which were remarkably fine and healthy. The class of Berkshire boars exhibited some very fine animals.

PRIZES.

BREEDING STOCK.—BULLS.

SHORTHORNED.

Best, calved in 1854, five sovs., Thomas Barnes, Esq.; second best, three sovs., John Christy, Esq.; third best, two sovs., Lord Dufferin.

Best, calved in 1853, five sovs., Charles Towneley, Esq.; second best, three sovs., J. Douglas, Esq.

Best, calved in 1852, five sovs, A. Bole, Esq.; second best, two sovs., J. H. Nangle, Esq.

DEVON.

Best, calved in 1853, three sovs., Robert Q. Alexander, Esq.

Best Scotch polled bull, large silver medal, Lord Talbot de Malahide.

Best Ayrshire bull, large silver medal, John Donaghy, Esq.

Best Alderney bull, large silver medal, William Brown, Esq.

Best Kerry bull, large silver medal, W. Owen, Esq.

Best bull of any breed, calved prior to 1852, large silver medal, Charles Towneley, Esq.; second best, lesser silver medal, Charles P. Leslie, Esq.

Best of all the prize bulls, the gold medal, Charles Towneley, Esq.; second best, lesser silver medal, Thomas Barnes, Esq.

JUDGES.—John Wright, Esq.; Charles G. Grey, Esq.; John Hall, Esq.; Robert Holmes, Esq.; Samuel Garnett, Esq.; Robert N. White, Esq.; and John Dyas, Esq.

COWS AND HEIFERS.

SHORTHORNED.

Best heifer, calved in 1854, large silver medal, T. Barnes, Esq.; second best, lesser silver medal, R. Chaloner, Esq.

Best heifer, calved in 1853, in calf, or producing a live calf within twelve months subsequent to the date of show, large silver medal, T. Ball, Esq.; second best, lesser silver medal, T. Ball, Esq.

Best heifer, calved in 1852, giving milk or in calf, large silver medal, C. Towneley, Esq.; second best, lesser silver medal, J. Douglas, Esq.

Best cow of any age, in calf, or having had a live calf within twelve months preceding the date of the show, large silver medal, C. Towneley, Esq.; second best, lesser silver medal, Viscount Monck.

DEVON.

Best heifer, calved in 1852, giving milk, or in calf, large silver medal, Roger Hall, Esq.

Best cow, of any age, in calf, or having had a live calf within twelve months preceding the date of the show, large silver medal, Robert Q. Alexander, Esq.

SCOTCH POLLED.

Best heifer, calved in 1854, large silver medal, Lord Talbot de Malahide.

Best cow, of any age, in calf, or having had a live calf within twelve months preceding the date of the show, large silver medal, J. Ganley, Esq.

AYRSHIRE.

Best heifer, calved in 1852, giving milk, or in calf, large silver medal, Hon. Mrs. T. Preston.

KERRY.

Best heifer, calved in 1852, giving milk, or in calf, large silver medal, the Earl of Charlemont.

Best cow, of any age, in calf, or having had a live calf within twelve months preceding the date of the show, large silver medal, the Earl of Charlemont.

Best of all the prize breeding heifers, giving milk, or in calf, the gold medal, Charles Towneley, Esq.

Best of all the prize milch cows, the gold medal, G. Towneley, Esq.

Best three milch cows, in calf, or having had live calves within twelve months preceding date of show, and *bona fide* the property of exhibitor, the gold medal, Viscount Monck, M.P.

THE FARMERS' GAZETTE CUP, VALUE £120.

Presented by Messrs. Purdon, for the best animal in the breeding classes of the neat cattle which, in the opinion of the judges, possesses the greatest merit, C. Towneley, Esq.

This cup was won in 1853 by a short-horned milch cow, Alice, and in 1854 by a short-horned milch cow, Butterfly, both animals the property of Charles Towneley, Esq., Towneley Park, near Burnley, Lancashire.

THE TENANT FARMERS' CUP, VALUE £50.

Presented by Charles Towneley, Esq., for the best animal in the breeding classes of neat cattle, reared by an Irish tenant farmer, having no means of subsistence except what may be derived from his farm, satisfactory proof of which will be required, John Christy, Esq.

This cup was won at the last show by a short-horned milch cow, Queen of Beauty, the property of Mr. John Christy, Fort Union, Adare.

FAT STOCK—FAT OXEN.

SHORTHORNED.

Best fat ox, calved in 1852, large silver medal, John Keatinge, Esq.

Best fat ox, calved prior to 1852, large silver medal, John Keatinge, Esq.

KERRY.

Best fat ox, calved in 1852, large silver medal, Joseph Lynch, Esq.

For the best pair of fat oxen, of any breed, that have been fairly and *bona fide* worked as plough bullocks up to May, 1854, large silver medal, Thomes Conolly, Esq., M.P.

Best of all the prize fat oxen, hon. certificate, John Keatinge, Esq.

FAT COWS ANY AGE.

For the best shorthorned, large silver medal, John Farrell, Esq.

For the best Devon, large silver medal, Edward Rotherham, Esq.

For the best of all the prize fat cows, hon. certificate, John Farrell, Esq.

FAT HEIFERS.

For the best heifer, of any breed, large silver medal, P. J. Kearney, Esq.

For the second best, lesser silver medal, Mrs. Lynch.

JUDGES: Robert Holmes, Esq.; Robert N. White, Esq.; John Dyas, Esq.

SHEEP.

LEICESTERS.

For the best one-shear ram, three sovs., C. P. Leslie, Esq. M.P.

For the best two-shear ram, three sovs., John La Touche, Esq.

For the best ram of any other age, three sovs., Wm. Owen, Esq.

Best three hogget rams, never clipped, two sovs., Frederick F. Hamilton, Esq.

For the best five ewes with their lambs yeaned in 1855, or in lamb, two sovs., Frederick F. Hamilton, Esq.

Best five ewe hoggets, never clipped, two sovs., Frederick F. Hamilton, Esq.

LONG-WOOLLED.

(Not qualified to compete as Leicesters.)

Best three hogget rams, never clipped, two sovs., David Kerr, Esq.

Best five ewe hoggets, never clipped, two sovs., David Kerr, Esq.

SHORT-WOOLLED.

For the best one-shear ram, two sovs., Hon. L. H. King Harman.

For the best ram, of any other age, two sovs., T. Butler, Esq.

Best three hogget rams, never clipped, two sovs., W. Owen, Esq.

Best five ewe hoggets, never clipped, two sovs., B. Clouson, Esq.

CHEVIOTS.

For the best one-shear ram, two sovs., the Marquis of Conyngham.

For the best two-shear ram, two sovs., the Marquis of Conyngham.

Best three hogget rams, never clipped, two sovs., the Marquis of Conyngham.

For the best five ewes with lambs yeaned in 1855, or in lamb, two sovs., the Marquis of Conyngham.

For the best five ewe hoggets, never clipped, two sovs., the Marquis of Conyngham.

FAT WEDDERS.

For the best pen of five long wool fat wedders, not exceeding two-shear, large silver medal, G. Thunder, Esq.

For the best pen of five Cheviot fat wedders, large silver medal, the Marquis of Conyngham.

SWINE.

BLACK PIGS.

Best boar, not exceeding twenty-four months old, five sovs., Alexander Montgomery, Esq.; second best, three sovs., same; third best, hon. certificate, Hon. Thos. Preston.

Best breeding sow in pig, or having had a litter within six months, three sovs., John C. Metge, Esq.; second best, two sovs., Rev. John Warburton; third best, hon. certificate, John C. Metge, Esq.

Best three breeding pigs of the same litter, under ten months old, three sovs., Alexander Montgomery, Esq.; second best, two sovs., Captain M'C. Bunbury; third best, hon. certificate, Henry Carroll, Esq.

Best litter of pigs, not exceeding four months old, accompanied by the sow, three sovs, Rev. John Warburton; for the second best, two sovs., same.

WHITE PIGS.

Best boar not exceeding twenty-four months old, three sovs., James L. Naper, Esq.; second best, hon. certificate, Colonel Kane Bunbury.

Best breeding sow in pig, or having had a litter within six months, two sovs., John Donaghy, Esq.; second best, hon. certificate, Mark A. Saurin, Esq.

Best three breeding pigs, of same litter, under ten months old, two sovs., John Donaghy, Esq.; second best, hon. certificate, Thomas Rutherford, Esq.

Best litter of pigs, not exceeding four months old, accompanied by the sow, two sovs., Mathias Harford, Esq.; second best, hon. certificate, J. O. G. Pollock, Esq.

Best fat pig of any breed, large silver medal, R. P. O'Reilly, Esq.

NORTHUMBERLAND AGRICULTURAL SOCIETY.—In the prize list now published, for the meeting at Alnwick, in August, we see his grace the Duke of Northumberland gives no less than a hundred pounds in premiums for swine. The competition both in large and small sorts is confined to *white* pigs, and the prize boars of both breeds may be claimed—the first in each class for £25, and the second in either for £20. The sows, also restricted in colour to white, must have a litter of no less than four pigs each with them at the show, any of which from a sow taking a prize may be claimed at £5 a piece. We hear his grace's object is to generally improve the pigs of the county, and especially to afford the labourers an opportunity of obtaining the best sorts. We are glad to observe, in the conditions on which animals are to be exhibited at the meetings of this society, that its grand purpose as a show of breeding stock is never lost sight of.

LIMPSFIELD AGRICULTURAL SOCIETY.

TRIAL BETWEEN HOWARDS' PATENT IRON PLOUGH, AND THE IMPROVED KENT PLOUGH.

Considerable controversy having arisen as to the merits of the above ploughs (the farmers generally in this neighbourhood being in favour of the latter) a spirited challenge was thrown out by Mr. Lashmar, an enterprising farmer and brewer, at Oxted, on behalf of himself and brother farmers to back the improved Kent turnrise plough against the capabilities of Howards' patents. The challenge was promptly accepted by Mr. Papprill, farmer, of Limpsfield, and a wager was made. The affair came off on Friday, on the farm of Mr. Skinner, of Pilgrims Lodge Farm. The iron ploughs were furnished by Messrs. Hammond and Purrott, ironmongers, Croydon, and a good muster of agriculturists and others attended; several ladies were also present. The field selected was on a wheat stubble, and very stiff loam. Three matches were made: the first between Mr. John Lashmar and Mr. Papprill; the second, between Mr. Papprill, with Howards' patent, and Mr. Frederick Young, with the Kent turnrise; and the third, between Mr. J. Lashmar and Mr. James Young—the last being a trial of skill between the ploughmen, both ploughs being the turnrise. There was another turnrise plough in the field belonging to Mr. Skinner, whose man, Robert Francis, did his work very well, but no competitor was entered against him. The other ploughmen were, William Hooker (in the employ of Mr. Papprill), — Tomblin (Mr. Papprill), William Hooker and Henry Keeley (Mr. Lashmar), William Reynolds (Mr. Frederick Young), John Francis (Mr. James Young), and — Tomblin in Mr. Papprill's second match. They were to plough half an acre of land each, not less than five inches deep, and not to exceed four hours in the work. In the second match, between Mr. Papprill (Howards' improved iron plough) and Mr. Lashmar (Kent's improved turnrise), Mr. Papprill was also declared the winner. In the third match, between Mr. John Lashmar and Mr. James Young (both Kents turnrise), Mr. Lashmar was the winner. The iron ploughs, with two horses, performed the stipulated quantity about half an hour before their competitors, with three horses and a driver. The appearance of the work done by the iron ploughs presented a far neater appearance than the others. The Judges were, Mr. Staveley, Chelsham; Mr. Rutley, Westerham; and Mr. Searle, Limpsfield.

After the match the party proceeded to the Bull Inn, when between thirty and forty sat down to a substantial dinner. Mr. Harrison, steward to L. Gower, Esq., occupied the chair, and Mr. Osborne was the vice-chairman. Amongst the company were Mr. Staveley, Mr. Rutley, and Mr. Searle, the judges; Mr. John Lashmar and Mr. Papprill, the competitors; Mr. John Howard, Mr. B. Steer, Mr. Thomas Steer, Mr. James Young, Mr. Frederick Young, Mr. Patching, Mr. Burfield, Mr. Skinner, Mr. Rattray, Mr. Collins, Mr. G. Marchant, Mr. Rattray, Jun., Mr. Jeffery, Mr. Loveland, Mr. Thompson, Mr. Purrott (Croydon), Mr. Page, Mr. Puddefoot, &c.

In the course of the evening, on the health of the Judges being given, Mr. Staveley, on behalf of himself and brother Judges, said, in discharging their duties they had endeavoured to do justice to all parties. He had seen ground since he had come in that neighbourhood, where the turnrise would have been preferable to the iron plough; but as an universal plough, they (the Judges) thought Howards' plough the best; and if it was more used the best results would be accomplished. By reducing the cost of growing corn and the expenses of cultivating the land, they would be enabled to compete more successfully with other nations.—*Abridged from the County Herald.*

SPECIFICATIONS OF AGRICULTURAL PATENTS

PUBLISHED DURING THE PAST MONTH.

[Can be had of Bennet Woodcroft, Esq., Great Seal Patent Office, by remitting postage stamps to cover value and postage for sums under 1s., and Post-Office Orders above it. Single copies will generally require six stamps, but one pound weight can be had for them.]

STEPHEN HOLMAN, Engineer, Colney Hatch, Middlesex—"Machinery for raising and forcing fluids, &c.," No. 689; date 1854—price 10d.

LOUIS MICHEL FRANCAIS DOYERE, Professor of Natural History, Paris, 4, South-street, Finsbury, London—"Machinery for the purification of grain," No. 1167; date 1854—price 1s.

THOMAS WALLWORTH, British gum manufacturer, Manchester — "Machinery for purifying grain and dressing flour," No. 1792; date 1854—price 10d.

PETER ARMAND, LE COMPTE DE FONTAINE MOREAU, 4, South-street, Finsbury, London—"Preserving corn and other dry seeds," No. 1812; date 1854—price 1s. 3d.

BENJAMIN HUSTMAYTE, Hockley-street, Homerton, Middlesex—"Metal Roofing," No. 1,968; date 1854—price 3d.

FISK RUSSELL, Massachusetts, United States—"Machine for Mowing Grass," No. 2,458; date 1854—price 10d.

THOMAS CRADDOCK, Engineer, Portway Foundry, Potter's-lane, Wednesbury, Staffordshire—"Steam Engines," No. 1,922; date 1854—price 11d.

PIERRE ANDRE DECOSTER, Civil Engineer, Paris—"Manufacture of Sugar," No. 1,921; date 1854—price 10d.

JULES MATHIEU, Civil Engineer, Paris—"Pumps," No. 1,895; date 1854—price 3d.

JOHN FISHER WILLIAMS 19, Artillery-place, Bunhill-row—"Joining Cast-iron Tubes," No. 1,893; date 1854—price 6d.

JEAN DE REDON, Civil Engineer, 4, South Finsbury-street, London—"Machinery for Reducing Wood to Fibre for Paper Manufacture," No. 1,891; date 1854—price 9d.

JAMES LAMB HANCOCK, Milford Haven, Pembrokeshire—"Machinery for Draining Land," No. 1,886; date 1854—price 7d.

GEORGE BURCH, Waltham Cross, Cheshunt, Herts—"Manufacture of Pulp from Wood," No. 1,883; date 1854—price 3d.

CHAS. MASCHWITZ, Merchant, Birmingham—"Instrument for paring and slicing fruits and roots," No. 1223; date 1854—price 5d.

ISAAC PIM TREMBLE, D.M., New York—"Ventilating Conservatories, &c.," No. 1943; date 1854—price 9d.

THOMAS CLOWES, saddler, Beverley, Yorkshire—"Muzzles for horses," No. 1974; date 1854—price 6d.

PETER ROTHWELL JACKSON, engineer, Salford, Lancaster—"Manufacture of Wrought-Iron Wheels," No. 1975; date 1854—price 10d.

WM. NASH and JOHN JEWELL—"Window Sashes and Frames," No. 1988; date 1854—price 5d.

CHARLES FREDERICK STANSBURY, 17, Cornhill, London—"Punches and Dies," No. 1998; date 1854—price 5d.

MOSES POOLE, Avenue-road, Middlesex—"Condensers of Steam Engines," No. 2103; date 1854—price 6d.

JOHN WESLEY HACKWORTH, engineer, Priestgate Engine Works, Darlington, Durham—"Steam Engines and Connected Gearing," No. 1971; date 1854—price 1s. 3d.

ROBERT RAWLINSON, C.E., Westminster—"Buoyant Ball Valves for Drainage or Sewerage Works, &c.," No. 2004; date 1854—price 9d.

ON THE APPLICATION OF FARM-YARD MANURE.

SIR,—As you suppressed a portion of my last letter on the plea that it was too complimentary to the conduct of your journal to have a place in it, I am driven unwillingly to the necessity of omitting the remarks which I should like to have made on articles which have lately appeared. I must, however, say—for I have an object in it—that I have read them with advantage; that my more practical bailiff has been unable to substantiate an objection against them; and that in every case in which we have carried your suggestions into practice, the results have fully equalled or surpassed the expectations raised. We have now many experiments going on, which have been generally suggested by the articles in your paper or the books which you have recommended, and the results of which I shall therefore hope to have the pleasure of sending you when realized. With one exception, which seems almost of advantage in ascertaining any *non*mathematical rule, there is not a principle involved in any leading article I can remember in your paper to which I can offer an objection. The exception occurred a month since, when you advised the application of part of the farmyard manure to the corn crop, and especially to the wheat crop. Now, taking for granted that we are both speaking with reference to the four-course system, I beg to differ from you; and think that the best plan as a principle is to apply the whole to the forage crop, or that half of the farm which, under the system in question, is consumed on the farm. I must at the same time admit that my farm is situated in a district in which I believe the four-course system is pursued as successfully as in any other district in England; and also that some, or rather most of the best farmers in that district, do apply part of their farmyard manure either to the turnip land just before sowing barley and seeds, or on the old seeds before sowing wheat, and consequently raise a proportional part of their turnips either with bones and ashes, or other drilling manures, and without farmyard manure. I need hardly say that the former of these practices, of the two, militates least against the principle I desire to advocate, as in that case the young seeds come in for a fair share of the manure applied. So far I allow it; but, inasmuch as it is also manuring corn—if my principle can be established—the practice is bad. To attain the former end, I should either top-dress the young seeds with a suitable compost soon after harvest, if it could be done without prejudice, or top-dress in spring with a mixture of equal parts of guano, salt, and superphosphate, and perhaps gypsum; of course liquid manure is generally preferable where it can be applied at an expense proportionate to its superiority. The particular top-dressing must depend upon many circumstances; but it is evident that where liquid manure is to be applied, the time and crop are both suitable. As for the latter object, land, under this system, will grow as much barley as the straw can support, if a sufficient quantity of food has been eaten on the turnip land in the preceding year; and in any case the only manure which a corn crop can require, under this system, is a dressing of salt, of about 4 cwt. per acre, more or less, according to circumstances. The chemical law explanatory of the fact that salt strengthens the straw of grain crops is to be found in a valuable paper signed "Samuel Parr," which appeared in the *Mark Lane Express* two weeks ago, and is also to be found in the *Farmer's Magazine* for this month. The fact I have ascertained myself, having first seen it asserted about two years ago in the *Mark Lane Express*. It will be impossible for me, in the short space which can be allotted to me in your paper, to enter into the reasons for pressing the general broad negative principle of applying no farmyard manure to any crop which is to be sold off the farm, without previously passing into the live stock, nor to any corn crop whatever, whether consumed on the farm or not. This principle I consider to be the basis, so far as relates to the application of manure, of the soundest system of farming under the four-course shift; or, in other words, the way in which a given quantity to start with of farmyard manure will pay the best in the long run, though as a matter of course it will be at first the most expensive, and will probably not pay as much as the ordinary plan for perhaps the first four years. The system here advocated is diametrically opposed to the one commonly adopted. But without attempting any argument at all in its favour, I believe the ordinary farmer is perfectly qualified to judge for himself which system will suit his own particular circumstances best; and at all events I know he will do so, whether the arguments are also presented or not, and also that most of them are perfectly aware of all that can be said both for and against it. As I have, however, adduced one very notable argument against myself, in citing the practice and authority of the best farmers in, as things go, a well-farmed district, this one argument I purpose in my next to show to be fallacious, which will be very apparent when we come to consider the obstacles which at present impede the progress of agriculture in England, and which undoubtedly prevent the prudent farmer from using his capital and skill to the greatest advantage. This I intended to make the subject of my present letter, but was led aside by the remembrance that there was one, and only one point, on which I could venture to differ from the editor of the *Mark Lane Express* in all the excellent articles on the theory and practice of agriculture which I have read in that paper; and I must qualify my difference again by stating that I have assumed we were both considering the subject as to the method of selling from a given quantity of land the largest amount of farm stuff that that land could produce at a profit, and not the largest amount that a prudent farmer will choose to make that land produce under a tenancy from year to year, which is, under the present state of the law, a very different thing. I need hardly add what the practical farmer, for whom only I am writing, will at once see is the weak point of my system, viz.—that there will be a total absence of white turnips, as I should not admit any turnip of an inferior rank to the hybrid into my turnip field, unless there were a few of Messrs. Drummonds' "improved early yellow," which can easily be grown after a crop of vetches have been mown and the stubble sheep-eaten; the main body of the turnip break being occupied by what should never be less than 30 tons an acre of the best fine top-and-tailed swedes, of which the best I have grown have been "the hardy green top," supplied also by Messrs. Drummond, of Stirling.

I am, Sir, your obedient servant,

Yorkshire, April 14. R. F.

KENNINGTON AGRICULTURAL AND CHEMICAL COLLEGE.

LECTURES ON THE GENERAL PHENOMENA OF THE EARTH, HAVING REFERENCE TO THE PRODUCTION AND MAINTENANCE OF ORGANIC LIFE.

BY CHARLES JOHNSON, ESQ., PROFESSOR OF BOTANY, GUY'S HOSPITAL.

LECTURE IV.

The watery action that has contributed to the breaking up of the mineral substance of the earth's surface, could only have taken place under the irregular disposition by which that surface is characterized, involving those depressions and elevations constituting the sea basin and the continents and islands. Had the lands been all level, the system of salutary change, nay, even of necessary adaptation to the requirements of organic being, would have been incomplete. The sources in which originated the varied and unequal mountain ranges, table lands, slopes, and plains, are too problematical to form a subject of discussion in the course before us, in which facts rather than hypotheses are to be considered. Geological researches have hitherto done little towards their elucidation; so little indeed, that the origin of those convulsive movements by which the crust of our globe is now agitated from time to time is a question still unresolved, and the phenomena of earthquakes and volcanic eruptions are open to varied explanations, each of them as plausible and incontrovertible as it is ingenious. To actions similar in their effects to these disturbers of recent periods, however, operating on a scale more extended, and under opposing circumstances differing rather in degree than in fact, may be ascribed all the inequalities that now exist, from the immeasurable depression of ocean depth to the highest mountain peak or ridge.

Let us now consider the operation of the wearing process on the interior of the land, as a consequence of the irregular disposition of its surface. The conflict between fluid and solid is still the prime agency by which it is effected: water is still the active, the assailing—earth, the passive and the yielding—but the action is varied; it is now the falling rain and hail, the trickling of the mountain rill, and the occasional rushing sweep of the torrent swollen by the melting of the snow, that become the substitutes of the ceaselessly recurring tides and the fury of the ocean storm. But the results are not less important, though the forces are weaker and their influence less constant and extended, because they carry yet a step farther those preliminary arrangements upon which the fulfilment of the Divine command, "Increase and multiply, and replenish the earth," is dependent. The process is a complicated one. The water, raised in the form of vapour from the surface of the sea by the heat of the sun, ascending into the upper regions of the atmosphere and collecting under the form of clouds, is wafted by the winds over every quarter of the earth, in order to refresh by rain and dew the plants and animals by which it is clothed and inhabited. Nature is lavish in the quantity she provides; and after fulfilling the various secondary purposes of her bounty, the superabundance is restored to the common reservoir through the medium of rivers; the action of which upon the land is of enormous extent, and its commencement may be traced from their very sources. The natural history of a river has been graphically written by a late naturalist and geologist, and we will trace it in company with him, or diverging only occasionally, as may be convenient for our purpose.

The rains that fall upon the ridges and summits of the mountains, the dews that are condensed there, and the snow that is melted, descend by an infinite number of little rills along their slopes, carrying off some portion of the materials of which these ridges and summits are composed, and marking their courses by numerous small channels or gutters. In their progress downwards, these little rills unite in the greater and deeper furrows with which the surfaces of all mountains are ploughed up, run off through the deep valleys that intersect the bottoms of the mountains, and collecting from all sides in the form of brawling brooks and torrents, descend into the more level country, unite with other streams similarly produced, and eventually become rivers. When the snow melts or when a storm takes place in these elevated regions, the mountain torrents become suddenly swollen, and rush down the declivities with a violence and rapidity proportioned to their steepness; they dash against the bases of the heaps of rocky fragments, that, originally precipitated from above by the action of frost or previous storms, generally form the sides of the more elevated valleys, carrying with them the pieces of which they are composed, already rounded by friction against the sides of the mountains during their previous descent, but which become still more smooth and polished by rubbing against each other as the water rolls them forward. In proportion as the swollen torrents reach the more level valleys, and the force of their currents becomes diminished, or when they arrive at more expanded basins which allow their waters to spread out, they throw out or leave upon their banks the largest of these stones that they have rolled down; the smaller fragments are deposited still lower, and generally nothing reaches the great canal of the river, except the minutest pebbles or the impalpable particles which afterwards subside in the form of sand or mud. It often happens that before these streams unite to form great rivers, they have to pass through large and deep lakes, where they deposit the mud carried down from the mountains, and whence their waters flow out quite limpid; in which case, however, the bottom of the lake being raised gradually from time to time, an important change of the locality is in course of progress.

The rivers in lower levels, and all of the streams that take their rise in lower mountains, hills, and uplands, produce effects upon the grounds through which they flow more or less analogous to those of the torrents from the higher mountains. When swollen by heavy rains they undermine the bottoms of the earthy or sandy hills that lie in their way, and carry their fragments to be deposited upon the lower grounds which they inundate, and that are more or less raised in height by each inundation. When these rivers reach the great lakes or the sea in which they terminate, and when, of course, that rapid motion by which the water is enabled to keep the particles of mud and sand in suspension, has nearly ceased, these particles are deposited at each side of their mouths, where they form low grounds, by which the coasts or banks of the river are gradually lengthened out into the sea or lake.

It is thus that we find the mouths of most large rivers bordered by extensive tracts of flat country, and frequently divided by low islands. Owing to the occasional resemblance of such islands in outline to the fourth letter of the Greek alphabet, represented by an equilateral triangle, they have received the general name of Delta, a title originally bestowed by the imaginative Greeks themselves upon the low alluvial country of Egypt at the mouth of the Nile. The kingdom of Holland, the Netherlands of Europe collectively, have been almost wholly formed in the above manner, from the ruins of more elevated lands, borne down by the Scheldt, the Meuse, the Rhine, and their attendant and tributary streams, and deposited at their mouths; while perhaps many thousand times the quantity of solid matter has been carried into the ocean depths during their formation, giving origin to a large proportion of those sands and shallows which render the navigation of the German Ocean so difficult and dangerous. Lower Egypt has been principally formed in like manner, by the foul, though sacred Nile, carrying down the ruins of the mountains of Abyssinia, and depositing them on its confluence with the Mediterranean Sea. Thus too the infant territories of the once proud Venice derived their origin from the deep and rapid course of the river Po; and our own Thames, though a mere brook in comparison, has formed much of the low lands of Essex and Kent, and would in time, if ever its navigation should be neglected, form islands at its mouth, as the Nile, the Rhine, the Ganges, and some hundred other rivers great and small, have already done. It is thus indeed that much of the more recent and uppermost loose strata of the earth, the strictly-called alluvial deposits of modern geology, have been accumulated, and the more level parts of its surface successively raised.

Such countries, however, while yet in the vicinity of the sea, especially if unprotected by projections of higher lands, are liable to occasional overflowings, and temporary, if not irremedial destruction, during stormy weather and high tides—this has frequently been the case along the low coasts of the Netherlands and the neighbouring territories of Sleswick and Holstein, many parts of which have been at times inundated by the ocean. The traditions and records of those countries, indeed, preserve the memory of many dreadful catastrophes, in which towns, villages, and rich and populous districts have been overwhelmed and laid waste, with a frightful sacrifice of human life, by the sea sweeping over them. Even at present much of these lands is insecure when strong winds and corresponding high tides concur to raise the waters above their ordinary level, which are only kept out by the dykes or banks raised by the inhabitants for their protection.

This constant tendency to elevation of the lower parts of our earth's surface at the expense of the higher, and consequent formation of new lands at the mouths of rivers, is a principal cause of that gradual diminution of extent observable in most lakes and inland seas; a diminution that, although so slow as to have been at times made a matter of question by some theoretical writers, is not the less certain in its effects, and must at some future period, however incalculably distant, completely alter the present aspect of the continent of Europe, by reducing the broad basin of the Mediterranean to the channel of a river; while the thousand torrents of Scandinavia are more rapidly laying the foundations of a new empire in the less extended bed of the Baltic. These notions are not merely visionary, nor the extent of the changes improbable, unless we assume an alteration in the laws of nature and the present properties of matter: they are producing by consequences that the ingenuity of man may in particular localities sometimes partially oppose, nay, even apparently revert, but which it is impossible to check in the plenitude of their action. That check may indeed be ordained to occur; but should it come to pass, it can only result from some vast convulsion of nature, which it is at present beyond the reach of human speculation to foresee or reason upon.

The general aspect of the extensive plain of Central Europe, stretching from the shores of the German Ocean to the confines of Asia, indicates that the present sea of the Baltic is but the remnant of a vast body of waters, once extending almost uninterruptedly over the countries now lying between the Dovrefeld and the Urals in one direction, and in the other from the mountain line including the Alps, the Carpathians, and the Caucasus, with their subsidiary northern offsets and hill-chains, to the shores of the Frozen or Arctic Ocean. The rivers originating in this lofty mountain system have covered considerable portions of this great level with alluvial soil, which, under a climate not subject to droughts of any long continuance, has rendered it available to cultivation; but the vast tracts of unreclaimed sandy heaths and moorland that still occupy, and indeed constitute, a remarkable feature of the northern and middle parts of Germany, of Poland, and of Russia, tend to prove the fact that it is its great river system alone which has rescued nearly the whole of Central Europe from a condition of barrenness, only differing in degree proportioned to their relative climates from that of the great desert of Northern Africa.

The original occupation of the great European plain by a probably shallow sea is too evident from a variety of circumstances to admit of question, and that even independently of its geological character. Whoever regards the relative situations of the Euxine and Caspian seas, and of the Lake or Sea of Aral, together with the state of the countries inclosing those masses of water, must admit the probability of their having been at some past period the deeper portions of a continuous ocean. A large proportion of the districts in which these seas lie is still a sandy desert, abounding in salt lakes and pools, and, where dry, more or less incrusted with salt, and containing shells of species still existing in their waters: the land is low, and around the Caspian and Aral considerably below the present ocean level, the surface of the former sea being estimated to be upwards of 300 feet lower than that of the Mediterranean. That the seas just mentioned had at some distant time a connexion with the main ocean is farther evinced by the abundance of seals that are found upon their shores; the seal being an animal incapable of migration to any distance overland; and, if so connected, it must have been as forming a part of that of which, as before stated, the Baltic Sea may be regarded as a remnant.

It is not intended to maintain that the rivers, now pursuing their meandering courses between the sedistant seas, have actually formed by their wearing and transporting action all of this intervening land that furnishes the subsistence of so many nations; causes of a totally different character have probably been in operation to produce its present condition of surface; but they have contributed to render those parts of it fertile that are now, in a state of nature, either covered with grass or forest, or, under cultivation, yielding place to the arts and industry of mankind. How far they may have been concerned beyond this, in regard to its existing state of elevation above the mean level of the ocean, we have not the means of ascertaining; but the fulfilment of the change from sea to dry land, extending over millions of square miles, however much it may be owing immediately to some uplifting agency from the interior of the earth, has not been unaided by alluvial interference; indeed, the mountain and the torrent provided, the remainder would be a necessary consequence of the lapse of time alone. We have only to consider a few of the circumstances associated with the natural history of rivers during the human period, to become aware of the vastness of their agency as levellers and land producers. The finest particles of earthy and organic matter carried down into the current of the Amazon by its numerous tributary streams, from the Andes of Peru and the central high lands of South America, and held in suspension during a course of between four and five thousand miles, discolour the waters of the Atlantic three hundred miles from its mouth. The Hoang Ho, or Yellow River of China, was computed, by Sir George Staunton, to carry into the sea to which it gives name two millions of cubic feet of its characteristic mud every hour; and rivers of smaller size and less extended course have produced changes of remarkable character, even within the later periods of history. The city of Ravenna, in Italy, a station for the Roman fleet in the reign of the Emperor Augustus, is now four miles from the sea; the intervening land, chiefly maritime marshes, having been formed since then by the current of the little river Montone, one of the drains of the Apennines. The town of Adria, once a flourishing seaport, whence the Gulf of Venice derived its early title of Adriatic Sea, is now twenty miles inland. The river Po carries down so much material from the Italian Alps, that, its former overflowings being hindered by embankments, its bed is now elevated above the roofs of the houses of Ferrara; while the annual encroachment of land at its mouth is computed to narrow the Adriatic at the rate of 228 feet per annum.

It is not alone the accumulation of solid matter in the bed or on the banks of a river, nor the collection of it in the Delta at its mouth, or even the shallowing of the sea beyond the latter—though this is sufficiently evident in the Baltic, the Gulf of Venice, and other narrow and land-locked waters—that include all the effects produced by its flow. The occurrence from year to year of overflowings, arising from periodical rains or snow meltings, carries similar matter, to dispose it over surfaces of varied extent, depending upon the width of the plains and valleys through which it takes its course. The ancient Egyptians venerated their Nile, not only as the fertiliser, but as the founder of their territory; its inundations gradually raise the valley over which they spread, depositing soil over the bordering and still encroaching sand of the Desert; and, in Northern Italy, the material, which through the interference of man has raised the bed of the Po above the city of Ferrara, would under the guidance of natural laws have contributed to the slower but more widely-spreading elevation of the low plains of Lombardy. The multiplication of such facts is unnecessary, but most alluvial deposits have owed more or less of that after-modification by which their fertility has been conferred and maintained, to the continuance of such action during periods long subsequent to their formation; an action that, commencing with the earliest existence of mountain ranges and sun-raised vapour, was a necessary prelude to the appearance of terrestrial vegetation.

The extent of these inundations is in many instances enormous, especially in tropical districts—those of the Parana, the principal branch of the Rio de la Plate, cover 36,000 square miles in Paraguay with an annual flood; and though estimates of this kind must always be uncertain and difficult to form unless upon a distant average, the extent of country periodically laid under water by those of the Amazon and the Mississippi, and of the Indus, Ganges, Brahmapootra, and other large rivers of Southern Asia, must be proportionally great. Independent of such circumstances, and diffusing river influence and silt deposits over a wider range, we may refer to the fact that streams, whether mighty as those mentioned, or insignificant as brooks, are liable to alter their courses owing to a variety of causes; leaving dry portions of their original beds, and occupying new ones—changes, which in course of time, often lead to a total diversion of the current. The wearing away of the base of a hill, the dislodgement of a mass of rock from its side, or the giving way of a part of its slope or declivity—accidents of not unfrequent occurrence—may, by apparently slight alteration, occasion such a catastrophe, and by so doing cover with alluvium parts originally free from such deposit. That similar phenomena have been reiterated from periods of incalculable distance, geological researches render evident; from the era of the vegetation of the coal measures downwards to our own, such changes have prevailed, and have assuredly operated at times on a scale of vastness almost inconceivable by those who have only witnessed recent events of the kind or read of them in history. But even at present, possibilities exist of the manifestation of inland water action, that might rival or even outvie the fabled deluge of Deucalion, and materially modify the aspect of a vast continent. The river St. Lawrence, of which the great lakes of North America may be regarded only as so many huge chasms in its channel, traverses a lofty tableland, rising by a succession of terraces from the basin of the Atlantic. These lakes, in extent and depth fresh-water seas, occupy the higher parts of this elevated district. The surface of the largest — Lake Superior — is estimated to be 641 feet above the level of the ocean, and with the other two great upper lakes, the Michigan and the Huron, covers an extent of 70,000 or 80,000 square miles: they have an average depth of 800 or 900 feet, and the surface of their waters is more than 300 feet above the level of the great plain or valley of the Mississippi—which is thus, in the very heart of the continent, liable to a deluge far more devastating than any natural convulsion recorded in the history of mankind, the flood in the time of Noah alone excepted. Should an earthquake shatter the rocky ridge by which the lake basins are at present upheld, or were it suddenly to subside, a body of water, more than 800 feet deep and upwards of 70,000 square miles in surface, would sweep the whole central portion of North America, from Canada to the Gulf of Mexico. It is true that, associated with the possibility in question, the probability of a sudden discharge of the water by a disruption or subsidence of the whole ridge at once, is opposed to the ordinary more gradual occurrence of such disturbances; but, waiving all speculation on this point, while the possibility remains, we have before us an example of what the water accumulated in the channel of a single river might accomplish, under certain contingencies which the known instability of the earth's surface forbids us to despise or to regard as chimercail.

Thus may the mechanical power of water be classed as a principal agent, not only in the original preparation of the crust of our globe for the purposes of organic life, but in modifying it from time to time to the renewal of its capabilities of production.

CUMBERED GROUND.—THE PROSPECT BRIGHTENS.

I showed in my last communication how the major part of the evening was employed; now let us talk about the concluding exercise.

The adults assembled by Mr. S. were innocent enough of the science of Numbers. There was one exception, however, in the person of a master carpenter who attended. Save him, not a man amongst them, the first evening, could do more than distinguish one number from another. This was raw material, certainly. The whole school was at first thrown into one class; but subsequently the quick pushed a-head, and left the slow behind, thus naturally forming two classes.

My friend found it necessary to commence with Numeration. This, as taught in the usual way, is very puzzling to the order of mind he had to deal with. But he contrived a much simpler plan, and enabled the men to write down with accurate dispatch any numerical amount that he might dictate to them.

I can scarcely introduce it here; but a little thought, one would imagine, must suggest the method to any ordinary mind. This ability of the men to write thus from dictation very much facilitated the evening's work. Suppose Mr. S. walking up and down the room, dictating line by line a long addition sum, peeping now and then over the shoulder of one and another to see that the figures are correctly placed. At the close of each line he advances to the black board, and writes the line, by which means all may see whether they are right or wrong.

The advantage of this course is evident; for both the ear is accustomed to the sound, as well as the eye to the arrangement, and form of figures, and large amounts.

In order to show the practical good resulting from a knowledge of arithmetic, so soon as he could, he deviated from the general routine; having grounded the men well in Simple Addition, he advanced by one step to Compound Addition.

This politic movement raised the poor fellows vastly in their own esteem, showed them the use of their application, and gave them a tenfold desire to progress. As Mr. S. went forward, he found the benefit of having given the men a thorough understanding at the onset of the principles of Numeration. The consequence was that the four primary rules were cleared by the large proportion of the class in the course of sixteen evenings, or in about thirteen hours—backed, it must always be remembered, by the most untiring application at home. Many a morning, on meeting his labourers, Mr. S. has learned from one and another that the midnight oil has been burnt freely, or that repose has been invaded by formidable columns of figures! One good result he had the gratification to ascertain, that their exercises kept the men from their old habits of intemperance. Those who had families, taught their children from night to night what they themselves had acquired. The evenings were thus anticipated with pleasure, and passed in a species of quiet and refining happiness. Many a wife and many a mother looked to my friend with a grateful blessing for the change that had come to her husband, or her boy. Nor did the change stop with the husband or the son—the *girls* caught the fever; and the *wives* were not content to be outstripped by their husbands or their children. One woman, whose son attended the adult class, remarked to Mr. S.: "You cannot think how pleasantly we spend our evenings, now compared with what we used to do, the girls and their father getting the lesson you give my John; my man quite counts on his evenings at home, and neither he nor the girls would miss one of them be it ever so." Such, good reader, are the humanizing effects of education: it needs not that you are a rich man, but that you have a heart for the work.

It is scarcely necessary to mention anything further with respect to the mode of teaching arithmetic, except it may be to advise that *the practical bearing of each rule upon their own little affairs* be shown to them. For instance, suppose, before they go for the night, such questions as the following are written upon the board, for them to copy, and solve at home:—

If each person consume   lbs. of bread in a year, how much will the whole family consume, and what will it cost at per lb.?

Give the number of acres of the parish, and population—how much to an acre: number of houses—how many in a house?

The population of the parish, in 1831, was 1,040; at the census of 1841 it had increased 7 per cent.; at the census of 1851 it had increased 5½ per cent. What is it at present?

Twenty per cent. of the population ought to be at school; but there are only fifteen per cent. How many are there, and how many absent who ought to be there?

None of the men you will collect in such schools have been accustomed to think in this way. This kind of question is very suggestive, and in various ways opens the mind.

With respect to the method of teaching writing, I should say it is better for a length of time, and until the hand gets pretty much formed, to keep to the slate. Hands unaccustomed to use lighter tools than spades, forks, and shovels, make sad work with pens, ink, and paper. The slate is, moreover, less expensive. Make a beginning with large letters, the lines being one and a-half or two inches apart. This opens the hand, and in time affords steadiness. Single letters first; then difficult combinations of two or three letters. The proper formation of the letters should be traced over the writer's copy, and under his eye. But it is needless for me to be so minute.

A little before the commencement of the second session, if I may so term the winter course, Mr. S. received a most surprising and gratifying proposal from the master carpenter, of whom I have spoken as having attended the adult class the first winter. It was in writing, and to the following effect:—

> " Sir,—I feel obliged to you for all your kindness in having helped me on so well last winter, with my summing particularly, as it has been of great use to me this summer in my contract work. I have been thinking that, as you don't teach any lads under fifteen—and there are a great many under that age who want to come —whether I might not try and prepare them, as I may call it, for you. My room is a good size, and I have no family, and I could do it. They would be willing to pay a penny a night for candles and fire, and I would give them my time in welcome, if I could anyhow help on the good work you have begun.
>
> " Your respectful and obedient servant."

This proposal was joyfully accepted. "This is just what I want," said Mr. S. to me: "I want to stimulate the poor to help the poor. I want not to break down the principle of self-reliance, but to build it up—not to stamp out the vegetation of independence, but to cultivate it. Hand to them weapons, or teach to them the use of those weapons they already have, and the poor will work out their own emancipation. Our forefathers, the ancient Britons, once hunted, chewed acorns, and burrowed for protection against inclement weather, above those mines of Shropshire and Wales where, in unsmelted ore, lay the latent vigour of England's commercial maturity; but when the Romans came they pointed to the iron, and behold the steam-engine—to copper, and behold the electrical girdle that soon will bind the world—to coal, and behold the extended sway of this small island, a very miracle to itself!"

"PROPERTY HAS ITS DUTIES AS WELL AS ITS RIGHTS."

The motto which heads our page, that "property has its duties as well as its rights," is coexistent with the period in which we live, and is one that demands both our acknowledgment and support.

In propounding this axiom, we are induced to inquire how far it is carried out; these established principles of action being acknowledged on all hands, but at the same time receiving little attention or support individually, and thus becoming almost a dead letter for all practical purposes?

The landed interest of this country is represented by a class of men unknown on the continent. Our proprietors of many thousands of acres are totally different from the Russian noble who sways a territory, or of the French landed proprietor of a dozen statute acres. Capital in this country effects its object by being subdivided, corresponding with what is carried out by our mechanical appliances and manufacturing departments. The article first roughly forged, is then hammered into form, and afterwards finished by various hands, each workman having his own department and his own task assigned him to fulfil; so the capitalist, as proprietor, invests his proportion in the purchase of the estate, and, by the assistance of the capital of others, improves it still further. The farmer pays as rent such a sum by way of compensation as will yield a sufficient remuneration for the outlay and the improvements; this he does either by agreement reduced to writing, called a lease, or by becoming tenant from year to year; and depending in the first instance upon the written undertaking for a stated term, and in

the second upon a tenancy, subject to the ordinary legal and customary restrictions that may be determined upon a six-months' notice.

We will, in the first place, examine how far the present system of leasing land is conducive to the interest of both landlord and tenant, as well as to that of the community at large; and will then examine how far the system of a yearly tenancy is conducive to the same object.

It is admitted that a farmer should have security for the capital that he is about to embark in the improvement of an estate, and thus be enabled, in the words of the tables, to ascertain how long it will take to recover it again, with fair interest and sufficient remuneration for his management and trouble. This determined upon, it will be necessary, after having determined the annual payment by way of rent, to fix the term of years necessary to accomplish the before-stated object; and, therefore, whatever hindrance or obstructions he may meet with, such as the preservation of game, the growth of timber, or inadequate buildings and roads, should form an important item in his calculations, for to whatever extent they exist, so much proportionably will they diminish the amount he ought to pay by way of rent. But, we fear, these items are too frequently overlooked by tenants in the first instance, or not estimated at their true value.

These preliminaries settled, the covenants become the next serious item with which he will have to contend, and which frequently act so prejudicially to his interest as to deprive him of the means of obtaining a livelihood by his occupation, and at the same time are not of the slightest consequence or beneficial to the landlord to retain; but because they may have been framed a century ago, are still retained, as any other appendage is retained to the estate, more by reason of their antiquity than utility, or by the stupid adherence of some town lawyer who may act as agent, and may not know the common application of the terms he uses, or the nature of the covenants he introduces.

The rent, the term of years, the landlord's reservations as to re-entry and cutting timber, &c., we need not dwell upon, but come at once to the pith of the question—to what extent the landlord requires to be protected from bad management or malicious injury on the part of the tenant, and then how that may be best effected, so as not to impede his free action or prevent his making the most of his occupation.

Nearly all old leases stipulate for the consumption of the whole of the green crops upon the premises—they stipulate also for the consumption of all the hay and straw, as well as for the expenditure of the manure arising therefrom, upon such portions of the farm as most require it.

This might have been proper fifty years ago, but under the present improved system of farming the case is entirely altered, or reversed. Let us suppose a farm near a railway, or in a populous neighbourhood, where potatoes, carrots, turnips, mangold wurzel, vetches, straw, hay, might all be sold at prices treble in amount that which could be realized if consumed upon the farm. For instance, take one acre of Swede turnips or mangold wurzel, assumed at 20 tons. This in many instances would realize £20; whereas the mere feeding value would not exceed £6, and the utmost return in manure, when combined with the straw of the farm, would not be sufficient to produce an equal quantity in the succeeding year; but, if sold, the surplus money so obtained would produce manure sufficient to obtain a yield of like quantity per acre from seven acres, and thereby enable the farmer to extend his operations, and improve his land to an almost unlimited extent.

In nearly all modern leases the tenant has a reservation enabling him to sell hay and wheat-straw to a limited extent, upon his bringing back in manure the presumed equivalent supposed to be abstracted from the farm. If this mode has been found to work beneficially as regards hay and straw, why has it not been extended to the root and green fodder crops of the farm? What difference would it make to the landlord whether the tenant, by not consuming his roots, might thereby abstract sufficient manure to supply an acre of land, or whether he had sold those roots and purchased another description of manure of treble the value? So of straw and hay: both these articles usually sell at more than double what they are worth to consume upon the farm. If a ton of straw worth 30s. in the market is only worth 10s. to consume, and a ton of hay worth £4 10s. is worth only 45s., and the manure produced from the first is worth 5s., and from the latter is worth 10s., would it not be more beneficial to both parties if double the quantity of manure in money value be brought upon the farm, that would effect an infinitely larger amount of profit, than to suffer the present disadvantageous system to be continued? Circumstances have so altered the position of the farmer, that he is now able to obtain manure of such highly concentrated power that carriage has become a mere item of expense. In the instance last mentioned, it will be seen that the tenant obtains only two loads of manure back upon his farm, worth 10s. for each load of hay and straw, that might have been sold; but if expended in guano, the surplus amount, over and above the feeding value, would have produced more than sufficient to restore the whole of the crop withdrawn, and also to assist in producing an increased quantity upon other additional acres.

As our space will not enable us to enter more fully into other covenants of the lease, we shall for the present merely avail ourselves of the opportunity of enforcing these observations upon the consideration of both landlords and tenants, as we feel assured that as rational men they will only need to be shown on which side their true interest lies, to enable them to take advantage of it, and to bring them to feel that "property not only has its rights, but its duties."

AGRICULTURAL REPORTS.

GENERAL AGRICULTURAL REPORT FOR APRIL.

For the time of year, the weather of this month has been extremely cold. Very little moisture having fallen in any part of the United Kingdom, vegetation has made but little progress; and the crops are therefore extremely backward, even in the most favoured localities. From the fact that the present appearance of the fields is by no means satisfactory, it has been attempted to be shown that great loss of the wheat plant has resulted from the comparative severity of the weather, and that large breadths of land must, consequently, be resown with another crop. It is quite true that instances have been met with, in which re-ploughing has been found necessary; but they are so extremely rare that they must fail to exercise any material influence upon the aggregate production. We are of opinion that the wheat crop now above ground is looking quite as well as ought to be expected, considering the late long and most severe winter; and that there are, therefore, no grounds for assuming that this year's crop will be small. Unquestionably, the breadth of land now under wheat culture is *in excess* of 1854, which, it will be recollected, was an extensive and most productive season in that respect. All out-door labours are now well advanced; and the sowing of most spring corn will, no doubt, be brought to a close quite as early as in the general run of years.

The transactions in most kinds of grain have been very moderate, but the changes in prices have not been to say important. From abroad only limited supplies have reached us; and the bulk of the consumption has, consequently, been met by our own growers. There is, we perceive, some interest excited on the subject of the supplies of wheat and other articles now in the hands of the farmers. Notwithstanding the heavy drain upon them, we have every reason to believe that they are still *seasonably large*, and of excellent quality. This is a point of serious importance at this time, because it is quite evident that we shall not be in a position to draw any supplies worthy of notice from the United States; and we may safely conclude that, as the Conference at Vienna is broken up without leading to any peaceable solution of the Eastern question, no direct imports of wheat can possibly take place from Russia; whilst the near continental shipments are expected to be very moderate. Operating upon these features in the trade, dealers generally have purchased with extreme caution; yet the supplies have somewhat steadily passed into consumption. The stocks of barley, oats, beans, and peas in the rick-yards are considered to be in excess of 1854 at this period. There is one feature which has, to some extent, interfered with the corn trade—viz., the large supplies of potatoes which have continued to make their appearance in the various markets of the United Kingdom; and it is somewhat remarkable that scarcely any really inferior qualities have been on offer. The moderate rates at which they have been selling, and their extremely good condition, have been productive of large sales; consequently, the consumption of bread has been diminished to some extent. There have been scarcely any arrivals from abroad, but the demand has been easily met.

The lambing season has gone off extremely well, considering the state of the weather. There have been very few dead lambs this season, and the supplies exhibited in most of the large consuming markets have been nearly, or quite, equal to those of last season, which, it will be recollected, was the best on record.

The seed trade generally has not been to say brisk, if we except the demand for some agricultural seeds. Linseed, the imports of which have been very extensive, though, of course, chiefly from India, has fallen in price; yet there has been scarcely any change in the value of cakes. The latter have sold steadily, though the amount of business doing in them has not been extensive. The supply of rough fat produced of late has been good. This has had some influence upon the tallow market, which has advanced, as there is the possibility of Russian produce being shortly placed under a severe restriction. Rough fat—which in April 1854 was selling at 3s. 7½d. per 8 lbs., has been quoted at 2s. 7½d. to 2s. 9d. per 8 lbs.

Very small quantities of guano continue to arrive, and the demand for all kinds has ruled very active, at extreme rates. Other manures have sold steadily, at full quotations. It is estimated that about 27,000 tons of guano are now on passage from Callao. The greater portion, however, has been sold for arrival.

As the next series of colonial wool sales will commence on the 3rd of May, the wool trade has been in a most depressed state: indeed, so few transactions have taken place that the quotations have been almost nominal. The new clip of English is proving large.

The supplies of both hay and straw have continued good, and the demand has ruled steady, at full prices. Meadow hay has sold at £2 15s. to £5: clover ditto, £3 5s. to £6; and straw, £1 4s. to £1 10s. per load.

REVIEW OF THE CATTLE TRADE DURING THE PAST MONTH.

Judging from the general appearance of the sheep which have been on sale in nearly the whole of the leading markets, it is tolerably evident that a great want of keep is beginning to be felt in some of our large flock districts. The weight of most breeds has materially fallen off; nevertheless, in the absence of any additions to our supplies from the continent, prices have ruled high and remunerative. As regards the beasts, however, there has been, if anything, an improvement in them; and the fine condition in which those from Norfolk have arrived in the metropolis, has elicited the marked encomiums of the butchers. Their weight has been unusually heavy, and nearly the whole of the Scots and shorthorns have carried a large quantity of internal fat. So far they have been profitable; yet butchers generally loudly complain of high prices and long credits. The present position of the trade in fat stock is one singularly important, and it is calculated to have more than ordinary importance upon future value. The great question which requires consideration is—will present rates be maintained during the remainder of what may be termed the Norfolk "season"? Evidently there has been a great drain of stock from that county for several months, and we have nearly overcome those commercial difficulties which have seriously interfered with wages, consequently with the consuming powers of the artizans and their families, whilst we may remark that we have a very strong impression that the importations of live stock from Holland will continue to exhibit a gradual decrease, notwithstanding that our quotations are most tempting ones. The fact appears to be, that home production is not likely to exceed consumption, and that a comparative scarcity of good beasts and sheep exists in Holland, owing to the large sales effected in that country, towards the close of last year, for the French markets. We are of opinion, therefore, that the value of stock in this country—assuming, of course, that the demand continues good—will be well supported during the whole of the year. It is stated that we shall receive more than our usual supplies from the northern grazing districts during the last five months of the season.

The health of the stock in most counties has continued satisfactory; indeed, scarcely any serious cases of foot-rot in sheep have come under notice.

As regards the actual state of the trade in Smithfield, we may intimate that it has continued tolerably steady, and that prices, though they have shown a disposition to fluctuate, have been fairly supported. In the early part of the month, owing to the backward state of vegetation and the coldness of the weather, the lamb trade was very dull; but it steadily improved towards its close, and prime Down lambs were worth 7s. per 8lbs. About two-thirds of the sheep have come to hand out of the wool. They have sold at from 6d. to 8d. per 8lbs. beneath those in the wool. The show of foreign stock has been very limited, and the following are the imports into London:—

	Head.
Beasts	2,086
Sheep	1,308
Calves	859
Pigs	—
Total	4,253

In the corresponding month in 1854, the total imports amounted to 4,760; in 1853, to 14,787; in 1852, to 5,444; in 1851, to 10,289; in 1850, to 4,667; in 1849, to 3,810; in 1848, to 5,391; and in 1847, to 5,826 head.

The following are the total supplies of stock exhibited and disposed of in Smithfield:—

	Head.
Beasts	18,172
Cows	385
Sheep and lambs	111,990
Calves	1,548
Pigs	2,725

The arrivals of beasts from Norfolk, Suffolk, Essex, and Cambridgeshire amounted to 10,200 Scots and shorthorns; from other parts of England, 2,800 of various breeds; and from Scotland, 1,280 horned and polled Scots, chiefly the latter per railway and steamers.

highest quotation for white wheat was 80s., and that of red wheat 70s. per qr. in Mark-lane. In nearly all the agricultural markets held during the week a good steady demand was experienced for wheat: generally the best samples commanded about 1s. per qr. advance; the supply being about as much as the millers required for their local demand, with little left to send away to distant markets.

The quantity of wheat brought forward at the second Monday's market in Mark-lane was again short from Essex and Kent, with little offering from distant counties: the town millers took it off steadily at about previous rates; whilst for foreign samples the demand was limited: the recent arrivals of soft qualities were offered on rather lower terms, not being such as our millers required; these go principally to the manufacturers of starch, and are no great favourite with them. The imports consisted of 444 qrs. from Antwerp, 52 qrs. from Dordt, 208 qrs. from Frederickshaven, 393 qrs. from Hamburg, 2,012 qrs. from Harlingen, 565 qrs. from Havre, 700 qrs. from Requejada, 122 qrs. from Rotterdam, and 30 qrs. from Uddevalla; making a total of 4,526 qrs., against 24,351 qrs. the corresponding week of last year. The London average registered 72s. 9d. on 4,682 qrs. The returns were 98,982 qrs. at 68s. 5d., against 36,628 qrs. at 73s. 5d. the corresponding week of last year, thus keeping up a good delivery and showing the superior yield. There was no variation in the quotation of the top prices, 80s. for white and 70s. per qr.: each of these must be considered to weigh 63lbs. per bushel, and both in prime condition. The tone of trade from the metropolis was assumed in all the country markets, and little variation occurred in the value of any description of wheat; the millers were, however, the principal buyers.

With the continued monotonous advices from Mark-lane, and full engagements of the farmers, they had neither time nor inclination to send forward supplies, and the quantity brought forward at the third market was again short; but nevertheless the town millers purchased it very slowly, at a reduction of fully 1s. per qr. on all samples of white, but fine qualities of red were in better demand, and in the value of these descriptions there was no variation: the purchases were, however, not made by millers, but by factors, to ship away from the port, and will not appear on the market again. The sales of foreign wheat were of a limited character, without any quotable change in the value of fine sorts. The imports consisted of 111 qrs. from Bremen, 72 qrs. from Dordt, 256 qrs. from the East Indies, 1,011 qrs. from Hamburg, 958 qrs. from Harlingen, 481 qrs. from Holbeck, 85 qrs. from Leer, 350 qrs. from Limpias, 717 qrs. from Oporto, 650 qrs. from Requejada, and 280 qrs. from Santander; making a total of 4,971 qrs., against 11,615 qrs. the corresponding week of last year. The London average registered 73s. 6d. on 4,259 qrs. The returns were 96,342 qrs., at 68s. 4d.; against 41,926 qrs. at 78s. 3d., the corresponding week of last year. The country markets held in the early part of the week were mostly of a declining character: wheat was quoted at some of them 1s. to 2s. per qr. lower; but towards the close trade braced up a little, there was generally more disposition evinced to get into stock, and where the deliveries were short an advance was established for good qualities, and those fresh thrashed.

Some of the Essex factors, in the previous week, refused to follow the market, and kept over a considerable portion of their supply of wheat for the fourth Monday's market; and there being a limited addition made thereto by the fresh land-carriage samples from the home counties, the millers took all the finest qualities off pretty freely at an advance of fully 1s. per qr., and an early clearance was effected, thus quite recovering the loss in the value of this article; and the week closed at precisely the same prices it opened at, the top quotation of the choicest white being 80s., and that of the finest red 70s. per qr. Throughout the month the delivery of rivets has been well kept up, and the market is generally cleared of this description as it is brought forward; and the prices have ranged from 58s. for moderate quality, up to 62s. per qr. for the choicest parcels, none weighing over 61lbs. per imperial bushel. We understand more than usual of this yielding wheat has been planted; and thus the quantity will be materially larger another season, if the crop turns out well. Being a bold-looking sample, it serves well for admixture with choice red qualities, and suits our contractors well. Foreign wheat was held with more firmness, in some instances at fully 1s. per qr. enhanced prices; but the demand was mostly of a retail character. The imports consisted of 1,233 qrs. from Bremen, 130 qrs. from the East Indies, 1,247 qrs. from Hamburg, 941 qrs. from Harlingen, 500 qrs. from Landscrona, 55 qrs. from Lyskihl, 970 qrs. from Oporto, 105 qrs. from Rotterdam, and 107 qrs. from Tonning: making a total of 5,288 qrs., against 27,816 qrs. the corresponding week of last year. The London average registered 73s. on 4,142 qrs. The general returns were 98,446 qrs. at 68s. 8d., against 54,353 qrs. at 79s. 11d. the corresponding week of last year.

There have not been so many fluctuations during this as last month in the article of flour. The top price has remained throughout the month at 65s.

per sack; but households have sold very irregularly, and with more competition than usual, ranging from 56s. to 60s. per sack. There have been good arrivals of country marks by the railways, and these have gone off slowly—with, however, a somewhat better trade at the close than at the beginning of the month, particularly for fresh-made samples. Norfolks, *alias* "Norwich Consols," have ranged from 48s. to 50s. per sack, with more buyers than sellers at the close. Parcels which have been some time at the various termini round the metropolis are now more pressingly offered, from a fear that when the weather has set in warm these may go out of condition; and next month will certainly try every sample of this description, and induce holders to accept the rates offered, rather than run the risk of their going off and becoming lumpy; whilst for the best fresh samples the demand is likely to set in, as usual, with hot weather to a larger extent than for time past. The bakers are allowed to be most limitedly supplied with any description, and they are likely to be all buyers at one and the same time; and this will be the case throughout the United Kingdom. The improvement of wheat the last week of the month brought buyers forward more generally; and the country millers summed up courage to demand higher rates for all fresh-made qualities; and the stocks will soon be worked up, and the new supplies go into consumption as they arrive, which has not been the case for months past. Spanish samples, and the best brands of America, were easier to place at advancing rates.

There has been somewhat more firmness in the article of barley during this than the foregoing month, and at slightly enhanced prices; but the excessive war tax on malt has prevented buyers taking this grain with any degree of spirit. The sunny days have, however, increased the consumption of beer in the metropolis, and brought forward the brewers, particularly the small ale brewers here and at a distance from town; and, from the limited quantity of malt made this season, a few more sales would tell on prices. The finest qualities of that made at Ware are now worth 70s. per qr.; and the very cold nights have assisted the maltsters materially to keep on at work, particularly those who manufacture the article for exportation, on which no duty is payable, who are encouraged to make more than usual. The deliveries from the farmers have steadily fallen off from week to week, but are yet considerably above those of the past year. Choice Chevalier samples are worth 34s. to 35s. per qr.; fair malting qualities, 32s. to 33s.; distillers' qualities, 31s. to 32s.; and the best grinding descriptions, about 30s. per qr., weight for weight. This is the lowest priced article of any in the trade; but no speculator can be induced to come into the market for it. The importations of foreign are chiefly from the south of Europe, as yet mostly Alexandrian, as from the north of Europe shipments are only just commencing. The last four weeks' averages were 30s. 5d. on 53,974 qrs., 30s. 8d. on 49,801 qrs., 31s. 1d. on 42,992 qrs., and 31s. 5d. on 36,163 qrs.

There have been moderate arrivals of oats throughout the month, and a good steady consumptive demand has been experienced, the supplies about keeping pace with the requirements of the metropolis. The first week's supply consisted of 8,083 qrs., more than half of which came by the Eastern Counties and Great Northern Railway. The second week's supply amounted to 32,134 qrs., principally from Ireland and foreign ports; of the latter, in some instances, a decline of 6d. to 1s. per qr. was submitted to on low qualities. The third week's supply was 28,771 qrs., the greatest part from Ireland; the dealers, expecting to purchase on lower terms, took very few off the market, as the factors would not give way to meet them. The supply the fourth week amounted to 17,800 qrs., nearly half from Ireland, and half from the continent, with a considerable number of small vessels in besides, and not included in this quantity—the first of the season from Denmark and Sweden; this liberal quantity induced the large dealers to hold off, in anticipation of making their purchases on lower terms; but as the weather remained very dry, and nights quite cold, although the days were sunny, vegetation was kept backward, and the trade assumed a firmer aspect at the close, with every prospect of enhanced rates, unless a complete change in the weather takes place, and the more so as we are on the eve of the month usually the best in all the year for selling oats, and the stocks in granary are much reduced; and we depend on the new imports of foreign, and our Irish supplies being well kept up from this point, to furnish the regular consumption of the metropolis. The averages were 25s. 6d. on 19,606 qrs.; 24s. 11d. on 20,756 qrs.; 25s. 10d. on 18,679 qrs.; and 25s. 10d. on 20,127 qrs.

There have been moderate deliveries of beans throughout the month, and a good sale has continued for all fine qualities; prices steadily improving, as the consumption is well kept up, and appears likely to be so for some time to come. There have been increasing imports of Egyptian, and these receded in value a few shillings per qr. in the early part of the month; but towards the close rallied again, and recovered nearly the whole which was previously lost in their prices. At this port we have not received so many as Liverpool and Glasgow, and here they have consequently not been so much depressed as on the West coast;

from the North of Europe none have yet come in, and the quantity from thence is likely to be very limited this season from the great consumption in the interior of Germany, and short stocks generally. The article for the present appears likely to support prices, notwithstanding the liberal deliveries for the time of the year. We believe that the usual quantity has not been planted this season, from the lateness at which the ground was prepared; and that other spring corn has taken their place, both barley and oats not being required to be got in so early, and the winter-sown are not generally well spoken of, from the severity of the weather having tried them more than usual. The weekly averages were 40s. 5d. on 4,709 qrs.; 40s. 8d. on 5,722 qrs.; 41s. 2d. on 5,416 qrs.; and 41s. 5d. on 4,921 qrs., being about the same as the quantity returned last year.

There has been very little change in the article of peas, and the demand throughout the month has been languid, mostly confined to the finest quality of white for boiling, or handsome maples. The deliveries have materially fallen off, and there appear now to be few left in the hands of the farmers, and all will be wanted for feeding purposes during the continuance of cold dry weather. The imports are likely to be very light this spring, so many having been consumed on the continent during the winter months. From Canada, the first vessels may bring in, as usual, small quantities; these, however, mostly go to Glasgow or to Liverpool, not many finding their way to this port. Stocks are everywhere much reduced, and not many are held out of the hands of the farmers; the consumption, however, is never great during the summer months, and we shall get, from one quarter or other, as many as we want. The weekly averages were 38s. 7d. on 866 qrs.; 37s. 9d. on 1,178 qrs.; 39s. 2d. on 809 qrs.; and 36s. 10d. on 757 qrs.

The trade in English cloverseed has been kept up well until the supplies failed, and a greater quantity than usual has been disposed of this year. In the early part of the month scarcely any red foreign had arrived, but the enhanced values of English induced the importers to secure a little in France, and latterly in Germany; and samples of old have been enhanced in value up to the close of the month, whilst of white the imports with the first steamers from Hamburgh were liberal, and this description was sent down fully 10s. per cwt.—rallied a little afterwards, and choice qualities again became scarce, but of the secondary sorts there was an abundance. With few exceptions, English may be considered all but used up, and of foreign red a small stock on hand, but a fair quantity of foreign white. Prices of all are too high to hold over.

English trefoil has been closely worked up, and the high prices paid for it have sent the importers to France; and, to finish the season, a few parcels have there been found, of very moderate quality compared with our own growth; and if any should be left over, it will be at much too high rates, and some loss must consequently be put up with, as it is not fine enough to be kept for next season, and must be of a poor colour when old.

The dry weather has sensibly checked the demand for tares; and with liberal imports of foreign there has been an accumulation of this article, a great desire to sell, and samples have been forced off at very varied and irregular prices: in some sorts, from the highest point, the decline has been fully 20s. per qr.: small qualities are now worth 40s. to 42s. per qr., large Brunswick 48s. per qr. (a little further decline, and the article will be at a safe price for feeding purposes.)

The imports of foreign grain for the month ended the 31st March, as published in the "London Gazette" of the 13th April, were 146,698 qrs. grain and 116,963 cwts. flour, against 766,437 qrs. grain and 600,292 cwts. flour in the corresponding month last year. The different articles stand thus:

	1854.	1855.
	qrs.	qrs.
Wheat	567,219	47,495
Barley	6,751	5,318
Oats	141,742	2,516
Rye	565	425
Beans	43,729	89,478
Peas..........	6,431	1,466
Total......	766,437	146,698
Flour (cwts.) ..	600,292	116,963

This great difference will continue to be kept up for the following month, after which period the Baltic supplies will commence to drop in; but from the United States little can be expected. A short time back, a very old and respectable broker at Liverpool gave it as his opinion as probable that America might this year become an importing country before next harvest; and about the same period, the 10th of April, an old and respected Peterborough merchant, now settled at New York, gave similar views in his circular, published in the *Mark Lane Express* on the 23rd of April, wherein he says: "Judging from present appearances, it is not improbable but that we shall, ere long, become an importing in lieu of an exporting country, and thus relieve the English markets of a portion of the superabundant supply furnished by the late bountiful harvest. At the present moment the value of wheat is 10s. per qr., and flour a dollar a barrel, higher than in the markets of Great Britain, with rye and barley at 46s., and oats at 24s. per qr."

The continental markets are now fairly resuming business, as from the Baltic spring shipments are commencing. Prices have been comparatively high, in spite of the dull advices from England.

At Dantsic, for heavy new wheat, as high as 75s. per qr. free on board was demanded. The freight offered for London was 5s. per qr., for Newcastle 4s. 4d., and for Leith 4s. 6d. per qr.

At Rostock, 62lbs. fine red wheat was quoted at 66s. per qr., 61lbs. at 63s. per qr. free on board for immediate shipment: 3,000 to 4,000 qrs. were destined for London.

In Hamburg, 60lbs. Danish wheat was quoted at 57s. per qr. on board.

Nearer home, the Belgian markets are advancing. Choice wheat, 63 to 64lbs., was worth 70s. to 72s. per qr., and trade there was assuming some importance.

In France trade is becoming more firm, but there is a want of life.

The Dutch markets are well supported, and prices of Zealand wheat are advancing.

From the Black Sea there is no prospect yet of any supply coming forward, and neutral vessels are scarcely allowed to leave the Danube, the Russians watching them most anxiously, and throwing every obstacle in the way to prevent their taking away grain.

In Egypt there is still corn to spare, and we shall get liberal quantities of wheat and beans, if we can give the shippers any encouragement for low breadstuffs. The former article is used in Ireland and at Glasgow, where the largest proportion of the shipments are directed. London gives no encouragement to this article: Liverpool is the grand emporium for Indian corn, and from thence large shipments are made to Ireland. A sensible advance has been established of 3s. to 4s. per qr., during the last two weeks of the month.

We closed our last review by hoping that April showers would work wonders on the crop of wheat; but, unfortunately, these have not been experienced, and the usually weeping month has proved one of the driest for a long time past, and if a change do not soon come, the country will suffer again very materially from a want of water. This plant has been a good deal injured by the high gales of wind prevailing from the north-east, blowing away the earth from the roots. All light soils, also the silty lands of the Fens, have felt them the most; and where a good plant was perceptible after the removal of the snow, it has gone off, and we know of one instance where a leading agriculturist ploughed up as much as 45 acres; and many others throughout various counties have resorted to the same method, and have either re-sown spring wheat or spring grain. From the numerous inquiries we have made, and the information extensively collected, we think we can fairly state that about one-half of the crop, consisting of that on heavy soils, looks healthy; one quarter promises only poorly; and that the remaining quarter has either been much injured, or so far destroyed, as to induce the farmers to plough it up; that all is very backward, and that according to present appearances it will require most auspicious weather to bring on harvest before the middle of August, whilst anything untoward will prevent its being ready for the sickle until September. But with these remarks we must add, that we prefer a short straw and a hot summer for a wheat crop: and after severe winters this is frequently the case, and yet may be the case this year. We must therefore put our trust in a Higher Power, and live in faith and hope!

The continuance of dry weather, sunny days, and very cold nights, with occasionally sharp frosts during the month, have enabled the farmers to progress most favourably with spring tillage; the earth had previously been so pulverized by the severity of the winter, that the land has worked admirably, and the most casual observer cannot but notice, as he travels through the country, the neat, clean, and garden-like appearance of every farm; that field-work has seldom been better performed; and that corn has gone into the ground in a most auspicious manner, and so far must be considered the harbinger of productiveness. There is now little more to do in the way of sowing grain; but the fallows and other lands will be forthwith prepared for the turnips: and this seed promises to be planted well also. From the backwardness of the season generally, every description of feeding-stuffs will be in requisition: the hay ricks will vanish fast; spring corn of all sorts go rapidly into consumption, until there is a good bite of grass for the cattle. At present there is but a poor nibble for the sheep; and this will continue to be the case until we have had some nice warm rain, a shift of wind to the south or south-west, and a much milder temperature at night.

IMPERIAL AVERAGES.

For the last Six Weeks.

	Wheat.		Barley.		Oats.		Rye.		Beans		Peas.	
Week Ending:	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.
March 17, 1855..	66	11	30	5	24	10	39	4	40	4	38	6
March 24, 1855..	66	6	29	9	25	0	39	1	40	0	38	9
March 31, 1855..	68	7	30	5	25	6	38	10	40	6	38	7
April 7, 1855..	68	5	30	8	24	11	42	2	40	8	37	9
April 14, 1855..	68	4	31	1	25	10	39	11	41	2	39	2
April 21, 1855..	68	8	31	5	25	10	38	11	41	5	36	10
Aggregate average of last six weeks	67	11	30	8	25	4	39	6	40	8	38	8
Comparative avge. same time last year	77	4	37	7	27	4	49	7	45	4	45	1
Duties........	1	0	1	0	1	0	1	0	1	0	1	0

CURRENCY PER IMPERIAL MEASURE.

Shillings per Quarter.

WHEAT, Essex and Kent, white	71	to 73	extra	74	79
Ditto, red	64	67	„	67	69
Norfolk, Lincoln. and Yorksh., red	64	66	„	67	68
BARLEY, malting, new.. 30 31			Chevalier..	32	33
Distilling.... 29 30			Grinding..	27	29
MALT, Essex, Norfolk, and Suffolk, new	65	66	extra		70
Ditto ditto old	66	68	„		70
Kingston, Ware, and town made, new	70	71	„		72
Ditto ditto old	68	70	„		71
RYE	—	—		39	40
OATS, English feed.. 23 24			Potato..	26	27
Scotch feed, new 26 27, old 30 31			Potato	30	32
Irish feed, white	23	24	fine		26
Ditto, black	22	23	„		24
BEANS, Mazagan	35	36	„	37	38
Ticks	36	39	„	38	40
Harrow	36	38	„	39	40
Pigeon	38	44	„	38	43
PEAS, white boilers 37 42.. Maple	37	39	Grey	34	37
FLOUR, town made, per sack of 280 lbs.	—	—		60	65
Households, Town 60s. 61s. Country		—		51	53
Norfolk and Suffolk, ex-ship	—	—		47	49

FOREIGN GRAIN.

Shillings per Quarter.

WHEAT, Dantzic, mixed..	78	to 80	high mixed —	82 extra	87
Konigsberg	74	76	„ —	80 „	82
Rostock, new	74	76	fine	80 „	84
American, white	76	80	red	70	72
Pomera., Meckbg., and Uckermk., red	73	74	extra	75	76
Silesian „	71	72	white	73	76
Danish and Holstein „	64	68	„	69	73
Rhine and Belgium „	—	—	old	—	—
Odessa, St. Petersburg and Riga..	64	66	fine	68	70
BARLEY, grinding 26 30			Distilling..	29	30
OATS, Dutch, brew, and Polands 27s. to 28s.			Feed..	25	26
Danish & Swedish feed 26s. to 27s.			Stralsund	27	28
Russian...... 26 28			French..	none	
BEANS, Friesland and Holstein				38	40
Konigsberg.. 36 40			Egyptian..	34	35
PEAS, feeding	36	37	fine boilers	40	42
INDIAN CORN, white	44	45	yellow	44	45
FLOUR, French, per sack	57	60	Spanish	57	60
American, sour, per barrel	36	38	sweet	38	42

PRICES OF SEEDS.

BRITISH SEEDS.

Cloverseed, red, (per cwt.)	58s. to 66s.
Ditto white	65s. to 73s.
Cow Grass (per cwt.)	63s. to 71s.
Trifolium Incarnatum (none)	00s. to 00s.
Rye Grass (per qr.)	22s. to 32s.
Furse (none offering)	00s. to 00s.
Tares, small 44s., ... large 48s. to 56s., ..	winter 00s.
Trefoil, (per cwt.)	25s. to 30s., extra 34s.
Sainfoin, scarcely quotable	60s.
Coriander (per cwt.)	20s. to 24s.
Carraway (per cwt.).... new 44s. to 46s., old	00s. to 00s.
Canary (per qr.)	46s. to 50s.
Hempseed (none)	00s. to 00s.
Linseed (p. qr.) sowing 68s. to 70s., crushing	65s. to 67s.
Linseed Cakes (per ton)	£12 0s. to £12 5s.
Rapeseed (per qr.)	new 78s. to 80s.
Ditto Cake (per ton)	£6 10s. to £6 15s.

FOREIGN SEEDS, &c.

Clover, red, French	50s. to 58s.
Ditto, white, German	55s. to 70s.
Tares (per qr.)	new, small 42s., large 56s.
Ryegrass, Italian (per qr.)	20s. to 22s., extra 30s.
Hempseed, small, (per qr.) 48s. 50s., Ditto Dutch,	56s.
Coriander (per cwt.)	15s. to 20s.
Carraway	36s. to 38s.
Linseed (per qr.) Baltic, 58s. to 62s.; Odessa,	66s. to 67s.
Linseed Cake (per ton)	£11 10s. to £12 0s.
Rapeseed	78s. to 80s.
Rape Cake (per ton)	£6 10s. to £6 15s.

HOP MARKET.

BOROUGH, MONDAY, April 23.

We have no particular alteration to notice in our market. The trade is moderate, and prices tolerably firm, at about last week's currency. Fine yearlings have now become scarce.

HART & WILSON.

POTATO MARKETS.

SOUTHWARK WATERSIDE.

MONDAY, April 23.

During the past week the arrivals have been moderate both coastwise and by rail, and trade still heavy for all sorts, except best samples of Regents.

The following are this day's quotations :—

	s.	d.		s.	d.
Yorkshire Regents	110	0	to	130	0
East Lothian do.	95	0	—	115	0
Perth, Fife, Forfarshire ditto..	90	0	—	105	0
Reds and Cups	65	0	—	85	0

BOROUGH AND SPITALFIELDS.

MONDAY, April 23.

The supplies of potatoes have become less extensive, and about an average business is doing, as follows:—York Regents, 100s. to 120s.; do. plants, 135s. to 140s.; Scotch do., 90s. to 105s.; do. cups, 80s. to 95s.; Kent and Essex Regents, 100s. to 115s.; middlings, 60s. to 70s.; Blues, 80s. to 95s.; Lincolns, 85s. to 110s. per ton.

COUNTRY POTATO MARKETS.—YORK, April 14: A fair supply of potatoes sold at from 2s. 6d. to 2s. 9d. per bushel, 9d. to 10d. per peck. LEEDS, April 17: We had a middling show of potatoes; wholesale 10½d. to 11d., and retail 12d. per 21lbs. MALTON, April 14: A fair supply of potatoes sold at from 8d. to 10d. per peck. RICHMOND, April 14: Potatoes, 3s. per bushel. SHEFFIELD, April 17: A fair supply of potatoes sold at from 10s. 6d. to 13s. per load of 18 stones. MANCHESTER, April 17: Potatoes, 9s. to 14s. per 252lbs.

PRICES OF BUTTER, CHEESE, HAMS, &c.

Butter, per cwt.	s.	s.	*Cheese, per cwt.*	s.	s.
Friesland	100	to 104	*Cheshire*	66	to 80
Kiel	102	106	*Chedd·r*	68	80
Dorset, old	90	96	*Double Gloucester*	60	70
Carlow	100	106	*Single do.*	56	66
Waterford	94	100	*Hams, York ....new*	76	82
Cork, new	92	100	*Westmoreland.* „	78	81
Limerick	84	94	*Irish* „	66	76
Sligo	96	102	*Bacon, Wilts., dried..*	72	76
Fresh, per doz.	12s. 0d.	15s. 0d.	*Irish, green....*	64	66

WOOL MARKETS.

BRITISH WOOL MARKET.

MONDAY, April 23.—As the public sales of colonial Wool—at which about 40,000 bales will be offered—commence on the 3rd of May, and as the supply of English Wool on offer is increasing, the demand, from the absence of all speculative demand and from the limited number of continental orders on hand, is heavy, and in many instances our quotations are next to nominal.

	s.	d.		s.	d.
Down tegs	1	0	to	1	1½
Half-breds	1	0	—	1	0½
Ewes, clothing	0	11	—	1	0
Kent Fleeces	1	0	—	1	1
Combing Skins	0	11	—	1	0½
Flannel Wool	1	0	—	1	1½
Blanket Wool	0	6	—	0	11
Leicester Fleeces	0	11	—	1	0½

LIVERPOOL WOOL MARKET, APRIL 21.

SCOTCH WOOL.—There continues only a moderate demand for laid Highland, at former rates, with slightly increasing stocks. White Highland is in fair request. The stock of good Cheviot and crossed wool is very much reduced, on account of the continuous demand for army clothing, and prime clips command fully late rates. Inferior lots are still neglected.

Printed by Rogerson and Tuxford, 246, Strand, London.

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Vice Admiral
James W. D. Dundas.

Commander of the British Fleet before Sebastopol in 1854.

London, Published by Rogerson & Tuxford 246 Strand 1855

PLATE V.

VICE-ADMIRAL JAMES WORTLEY DEANS DUNDAS,

LATE COMMANDER-IN-CHIEF OF THE BLACK SEA FLEET.

Vice Admiral James Wortley Deans Dundas was born in 1785, and is the son of James Deans, Esq. M.D., of Calcutta, by Janet, daughter of Thomas Dundas, Esq., of Fingask, great-grandson of Charles, sixth Earl of Lauderdale, and nephew of Thomas Dundas, a General officer of distinction, who died in 1794. His present surname was taken on the occasion of his marriage.

We borrow from O'Byrne's "Naval Biographical Dictionary" the following account of the services of this distinguished officer.

He entered the navy on the 19th of March, 1799, as a first-class volunteer, on board the *Kent*, 74, Captain William Johnstone Hope, bearing the flags, in succession, of Lord Duncan and Sir Richard Bickerton; in which ship he attended the expedition to Holland, in August, 1799, and conveyed Sir Ralph Abercromby from Gibraltar to Egypt, in December, 1800. He continued to serve as midshipman at the Blockade of Alexandria, until transferred, in July, 1801, to the *Leda*, 38, Captain George Hope, with whom he was soon afterwards ordered to Lisbon. In November, 1802, he joined the *Glenmore* frigate, Captain John Maitland, and accompanying that officer in the *Boadicea*, 38, was present in a very spirited skirmish with the French 74-gun ship *Duguay Trouin;* also at the capture of *La Vanteur*, national lugger of 12 guns, and at the Blockade of Rochefort. Being promoted (from the *Monarch*, 74, flag-ship in the North Sea, of Lord Keith) to a Lieutenancy, 25th of May, 1805, in the *Cambrian*, 40, Captain John Poo Beresford, Mr. Dundas, in the course of the same year, assisted at the capture of three privateers, carrying in the whole 40 guns and 225 men. After officiating for a few weeks as Flag-Lieutenant in the *Leopard*, 50, to the Hon. George Cranfield Berkeley, on the North American station, he was awarded a second promotal commission, dated 8th October, 1806. During nearly seven months' command of the *Rosamond*, 18, Captain Dundas was employed in attendance on the British Ambassador to the King of Sweden, pending the Siege of Stralsund, and was injured by the bursting of a shell while actively endeavouring to extinguish a fire which had broken out in the dockyard at Copenhagen, a few nights after the surrender of that town to Lords Cathcart and Gambier. Assuming post rank October 13th, 1807, Captain Dundas was next appointed—about the same period to the command, *pro tem*, of the *Cambrian*, 40; March 9th, 1809, to the *Stately*, 64, bearing the flag in the Baltic of Rear-Admiral Thomas Bertie; January 31st and September 8th, 1812, to the *Venerable*, 74, and *Pyramus*, 36, in the latter of which ships he conveyed Sir James Saumarez from Gottenberg to England, and captured, April 20th, 1813, and February 18th, 1814, the privateers *Zebra*, of 10 guns and 38 men, and the *Ville de l'Orient*, of 14 guns and 97 men; August 16th, 1815, to the *Tagus*, 38, on the Mediterranean station, whence he returned in January, 1819; August 6th, 1830, to the *Prince Regent*, 120, flag-ship of Rear-

Admiral William Parker, with whom he served in the Tagus until the early part of 1832; and April 5th, 1836, to the *Britannia*, 120, bearing the flag of Sir Phillip Durham, at Portsmouth, where he continued until April 7th, 1838.

Admiral Dundas's promotion to flag rank dates from November 23rd, 1841. He is a Deputy Lieutenant for Berkshire, and sat in the last Parliament for Greenwich; was appointed naval Aide-de-Camp to William IV. in 1831; a C.B. in 1839; a Lord of the Admiralty, under the Whig Administration, in 1841; and resumed his seat at the Board as one of the Naval Lords in 1846.

He married, on the 2nd of April, 1808, his first cousin, Janet, only daughter and heiress of the late Charles Dundas, Lord Amesbury, by Ann, daughter and sole heir of Ralph Witley, Esq., of Aston Hall, county of Flint. By that lady, who died 20th April, 1846, he had issue—three daughters and two sons, of whom the eldest, Charles, an officer in the Coldstream Guards, was M.P. for the Flint district in 1838.

PLATE VI.

A HEREFORD OX,

THE PROPERTY OF WILLIAM HEATH, ESQ., OF LUDHAM HALL, NORWICH,

For which the first prize, the Gold Medal, and an extra prize of Twenty Sovereigns, were awarded at the Birmingham Cattle Show in December, in 1854. The dead weight of this animal was 131 stones of 14 lbs.

This ox was a twin; the brother of it was show at Birmingham, in the year 1853, and won the same prizes as this animal did in 1854; he was at the Smithfield Club Catttle Show, in Baker-street, last year, and won the first prize in his class: and we understand there was so little difference between him and the animal to which was awarded the Gold Medal, that the Judges were for some time divided as to their merit. When the twins were first exhibited at Ludlow, in Shropshire, where Mr. Heath purchased them, they won the first prize in their class; and also the first prize at Hereford shortly after.

ON RAIN FALLS.

BY CUTHBERT W. JOHNSON, ESQ., F.R.S.

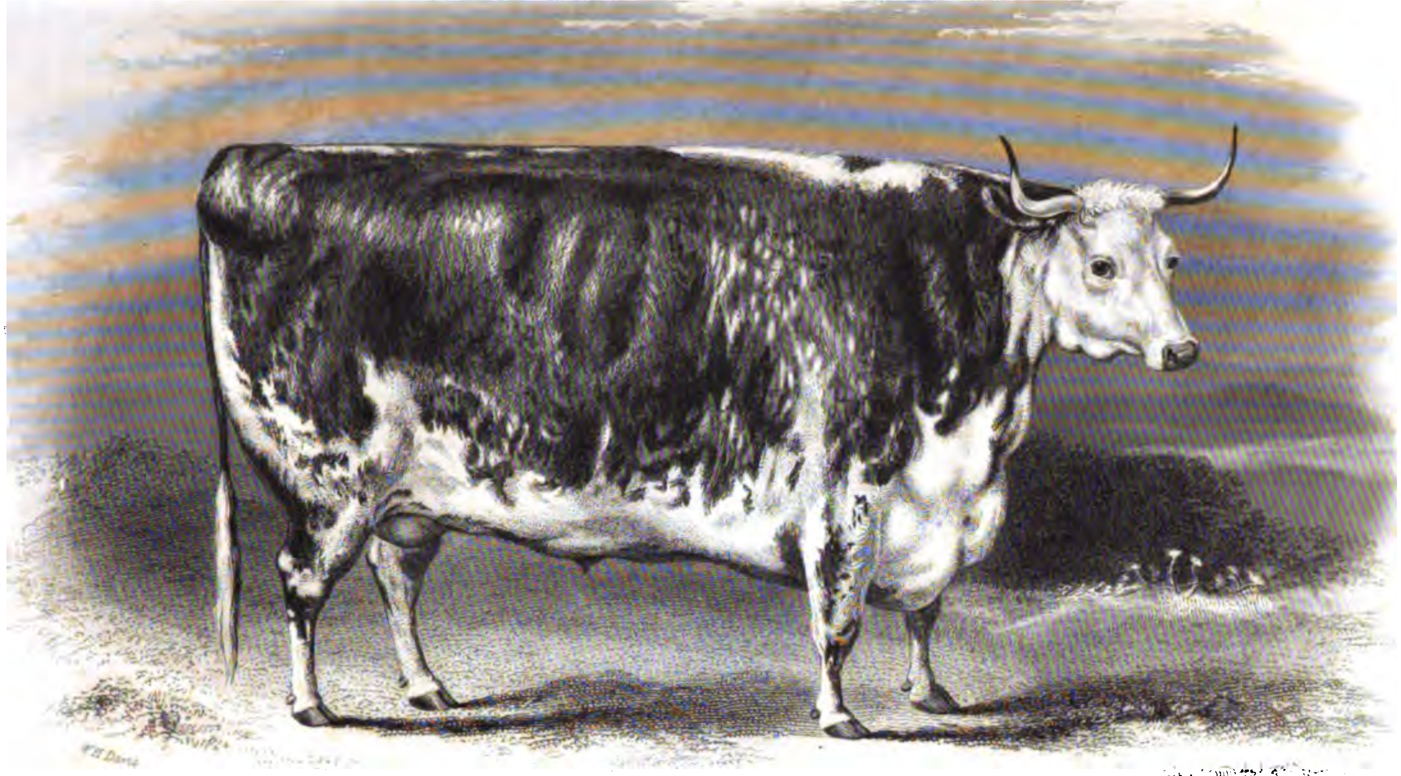
It may be useful, at a period when the farmer is improving and extending his drains, if we examine a few carefully-ascertained facts upon so all-important a subject for agriculture—if, for instance, we ask ourselves as to the varying amount of rain, and its composition as it descends from the atmosphere; and then, having examined it as it falls upon our soils, follow it and see how it escapes from those lands, how much evaporates, how much filtrates or drains away; and in thus sketching the results of a morning's inquiries, our labours may be of use to those who have been perhaps too busily employed in other avocations for such minute and lengthened examinations.

The all-important showers which fall upon our fields vary very materially in different seasons. Let us examine the rainfall in the neighbourhood of London, in inches and tons per acre during the last ten years. The amount in each year was as follows:—

	In inches.	In tons per imperial acre, about
In 1844	24.9	2,490
1845	22.4	2,240
1846	25.3	2,530
1847	17.8	1,780
1848	30.2	3,020
1849	23.9	2,390
1850	19.7	1,970
1851	20.5	2,050
1852	34.2	3,420
1853	24.3	2,430
1854	18.9	1,890

It may be hence noted that nearly double the quantity of rain fell in 1852 than in 1854; and that this excess was equal to about 1,440 tons of water per imperial acre.

Of the ammonia and other foreign substances showered over our lands in every rainfall, many interesting facts have been recently gathered, some



A Hereford Ox.

The Property of Wm. Heath Esq. of Ludham Hall Norwich for which the First Prize the Gold Medal and extra Prize of [illegible] were awarded at the Birmingham Cattle Show Dec. 1854.

London, Published by [illegible] Strand 1855

of which materially illustrate the advantage of keeping the land not only free from stagnant water, as by good drainage, but as open as possible to the free circulation of the atmosphere, and the watery vapours which it contains: for instance, M. Boussingault, in his examinations of the quantity of ammonia present in rain water, collected at a distance from populous places, detected upon an average about a quarter of a grain in a gallon of water; which is less than one-seventh of the amount detected in the rain water of Paris. Then, again, it is found that the proportion of ammonia present in rain during its fall varies considerably; that it is largest at the commencement of a shower, and diminishes towards the end; and it is very noticeable that the water collected during fogs is unusually rich in ammonia: it then contains, it seems, on an average about a third of a grain, and in some instances as much as four grains per imperial gallon. Professor Way (*Journal R. A. S.*, vol. xiv., p. 379) examined the rain which fell in Oxfordshire during the month of October, 1852, from the result of which Mr. Pusey has calculated that, supposing the average depth of rain to be equal to 28 inches, that then there annually falls in the rain water upon every imperial acre, of

Ammonia	28.59 lbs.
Nitric acid	68.91 „

Much of this, as he observes, especially the ammonia, is lost—perhaps by exhalation from the surface of plants or of the land, after slight showers. Enough, however, of both must remain to account for the luxuriant growth which frequently follows a thunder-storm, and also to illustrate the psalmist's expression that "the clouds drop fatness." This atmospheric distillation may also account for the permanent fertility of downs from which the sheep have for centuries been removed every night, and in some degree for the benefit conferred by rest upon fallows.

If, then, we find that some portions of the rain which descends upon and blesses our fields evaporates from the soil, and other portions descend into or filtrate through the soil, the next rational object of our inquiries leads us to ascertain the amount of these portions, varied as they must be in amount, with different soils, temperature, and currents of air.

Now amongst the most practical of the observers of these phenomena, we are indebted (*Jour. Roy. Ag. Soc.*, vol. v, p. 146) to Mr. John Dickinson, of Abbot's Hill, near King's Langley, Herts, the eminent paper-manufacturer, for a register, extending over the period of eight years (1836 to 1843 inclusive), of the quantity of rain which fell in his locality, and of the quantity which may be presumed to have passed through the soil. The first datum is determined by the common rain-gauge; the second is derived from a gauge invented many years since, for this special purpose, by the illustrious Dr. Dalton. The construction of the rain-gauge needs no remark, and the Dalton gauge is equally simple. It consists of an open-top cylinder or rain-receiver, sunk vertically in the earth, level with its surface, having a false bottom perforated with holes, like a cullender, which supports three feet depth of soil within the cylinder, through which, and through the cullender, the excess of the rain—or the portion not evaporated—filtrates to the close bottom of the vessel; and this communicates, by means of a small pipe, with a vertical tube, whose diameter bears some definite proportion to that of the receiver, and is sunk so much lower in the earth as to have its top nearly on a level with the bottom of the receiver. Thus, all the water which permeates the soil contained within the rain-receiver flows into the tube, and is measured by a float carrying a divided stem, and indicating, in parts of 1-100th of an inch, the quantity of rain which has entered it. The measuring tube has a cock at the bottom for evacuating its contents from time to time, and bringing the scale to zero.

Mr. Dickinson's rain-receiver has a diameter of 12 inches, and is 36 inches deep to the false bottom; it was originally filled with the soil of the country—a sandy gravelly loam—and has constantly had grass growing on it. The contents of the receiver, therefore, represent fairly the natural state of such soil; whilst the gauge indicates the quantity of water which a drain, at a depth of three feet, would have to convey away. The proportion which this quantity bears to the rain is obtained by comparison with the rain-gauge, and their difference gives the quantity evaporated, assisted by the action of the succulent grasses; we may, however, for the present purpose, consider the whole of this last quantity under the term evaporation. The result of the examinations he found to be as follows:—

RAIN IN INCHES FROM APRIL TO SEPTEMBER INCLUSIVE.

Years.	Rain.	Filtration.	Evaporation.
	In.	In.	In.
1836	12.20	2.10	10.10
1837	9.80	0.10	9.70
1838	10.81	0.12	10.69
1839	17.41	2.60	14.81
1840	9.68	0.00	9.68
1841	15.26	0.00	15.26
1842	12.15	1.30	10.85
1843	14.04	0.99	13.05
Mean	12.67	0.90	11.77

OCTOBER TO MARCH INCLUSIVE.

Years.	Rain.	Filtration.	Evaporation.
	In.	In.	In.
1836	18.80	15.55	3.25
1837	11.30	6.85	4.45
1838	12.32	8.45	3.85
1839	13.87	12.31	1.56
1840	11.76	8.19	3.57
1841	16.84	14.19	2.65
1842	14.28	10.46	3.82
1843	12.43	7.11	5.32
Mean	13.95	10.39	3.56

FILTRATION AND EVAPORATION PER CENT., AND IN TONS PER IMPERIAL ACRE, FROM APRIL TO SEPTEMBER INCLUSIVE.

	Filtration.	Evaporation.	Rain, per Acre, Filtrated.	Rain per Acre, Evaported.
	Per Cent.	Per Cent.	Tons.	Tons.
1836	17.3	82.7	212	1023
1837	1.0	99.0	10	982
1838	1.2	98.8	12	1082
1839	15.0	85.0	263	1500
1840	0.0	100.0	—	980
1841	0.0	100.0	—	1545
1842	10.7	89.3	131	1099
1843	7.1	92.9	100	1322
Mean....	7.1	92.9	91	1192

FROM OCTOBER TO MARCH INCLUSIVE.

1836	82.7	17.3	1574	330
1837	60.6	39.4	693	452
1838	68.8	31.2	855	393
1839	88.2	11.8	1246	159
1840	69.6	30.4	829	362
1842	84.2	15.8	1437	269
1843	73.2	26.8	1059	387
1844	57.2	42.8	720	538
Mean....	74.5	25.5	1052	360

In commenting upon these meteorological observations, Mr. Parkes very truly remarked, when alluding to the permeability of different soils:—"A natural agricultural bed of porous soil resembles an artificial filter, and it is unquestionable that the greater the depth of matter composing such filter, the slower is the passage of water through it. In stiff loams and clays, however, but more particularly as regards the latter earth, the resemblance ceases, as these soils can permit free ingress and egress to rain-water, only after the establishment of that thorough net-work of cracks or fissures, which is occasioned in them by the shrinkage of the mass from the joint action of drains and superficial evaporation. These fissures seem to stand in the stead of porosity in such soils, and serve to conduct water to drains rapidly after it has trickled through the worked bed; it is possible, too, that in deeply drained clays of certain texture the fissures may be wider, or more numerous, in consequence of the contraction of a great bulk of earth than when such soil is drained to a less depth. However this may be, it is asserted by several respectable and intelligent farmers in Kent, who have laid drains very deeply in clays and stiff soils, that the flow from the deepest drains invariably commences and ceases sooner than from shallower drains, after rain.

In whatever soil the farmer's drains are placed, sooner or later the filtering water finds its way down to the smaller branch and main drains. These generally discharge the water with a velocity which depends upon their fall and freedom from obstructions. Some useful facts upon the velocity of the current in the large drains of the metropolis, which is found necessary to clear away the soil which collects in them, have recently been published by the engineers to the Commissioners of the Court of Metropolitan Sewers (Bazalgette and Donaldson's Report). They give several authorities:

"Mr. Wicksteed, in his Report upon the drainage of Leicester (p. 19), states: 'From experiments made by me with great care, I find that, with a bottom velocity of 16 inches per second only (or 0.9 mile per hour), heavy pieces of brick, stone, &c., will be removed; and that, with a velocity of 21¾ inches (or 1.24 miles per hour), even iron borings and heavy slag will be removed. The above minimum velocity will therefore be sufficient.' Mr. Beardmore, in his work on hydraulics, observes (p. 8) that 'a velocity of 150 feet per minute (or 1¾ miles per hour) will generally prevent deposit in pipes and sewers.' Mr. John Phillips states (see First Report of Sanitary Commission, 1847, p. 177): From observation and experiment, I find that it requires a constant velocity of current to be running through the sewers, equal to about 2½ feet per second, or 1¾ miles per hour, to prevent the soil from depositing within them.' Professor Robinson, in his treatise on rivers, adds that—

3 inches in a second will separate silt, particles of fine clay.
6 „ „ „ fine sand.
8 „ „ „ coarse sand.
12 „ „ will lift and sweep away fine gravel.
24 „ „ will lift and sweep away gravel 1 inch in diameter
36 „ (or about 2 miles per hour) will lift and sweep away angular stones of the size of an egg."

The effect of increasing the fall of drain-pipes, in decreasing the size of the pipes necessary to discharge a given amount of water, is a most important question for the farmer's consideration. Mr. N. Beardmore, in his Hydraulic Tables, gives the amount of the discharge of water from pipes running full, with varying falls. It is as follows, the amount of discharge per minute being given in cubic feet and inches:

Diameter	Rate of Fall.		
of Pipes.	1 in 1,056.	1 in 528.	1 in 264.
3	2 26	3 2	4 5
6	12 8	18 1	25 6
9	35 3	49 9	70 6
12	72 5	102 5	155 0
15	127 0	179 0	253 0

Such are the class of observations which the engineer and the meteorologist store up for the use of their countrymen; and it need not be urged upon the readers of the *Farmer's Magazine* that to travel even over the drainage works of their fields, aided by such laborious and accurate observations as those which we have been considering, cannot fail of being productive of useful results to agriculture.

CLASSIFICATION AND EXTIRPATION OF WEEDS.

BY J. D.

(Continued.)

Section II.—Perennial Weeds.

Plants of perennial growth, of an herbaceous constitution, die yearly in the stem and leaves: the roots live in the ground over winter, and send up a fresh stem annually, for an indefinite period of time. The seeds are matured yearly, and assist to propagate the plants. The nature of these herbs imposes much difficulty in the extirpation, as the number is large, and the dissemination two-fold.

1. VERNAL SANDWORT,

Or the "Arenaria verna" of botany, is a very troublesome weed on light, moorish soils. The genus of plants is so called from the Latin word "Arena," meaning sand, in strict allusion to its native soil. It belongs to the class and order "Decandria trigynia" of Linnæus, and the natural order "Caryophylleæ" of Jussieu.

Generic character: Calyx—perianth five-leaved; leaflets oblong, acuminate, spreading, permanent. Corolla—petals five, ovate, entire. Stamina—filaments ten, subulate (five alternately inferior); anthers roundish. Pistil germinate; styles firm, erect, reflex; stigmas thickish. Pericarp—capsule ovate, covered, one-celled, three or six-valved. Seeds very many, kidney-shaped. The number of stamens is not constant.

Essential character: Calyx five-leaved, expanding. Petals five, entire. Capsule one-celled, many-seeded.

The weedy species of the Arenaria in Britain is the "Arenaria verna," or "vernal Sandwort." Leaves subulate, rather obtuse. Stem panicled. Petals obovate, longer than the calyx, three-nerved; nerves distant, equal. Root perennial, long, much branched. Stems numerous, five or six inches high, round, somewhat pubescent and viscid, branched at the base, and panicled above. Leaves erect, patent, subulate, rather obtuse, three-nerved beneath, and above channelled, connate, and spreading at the base. Bracteas ovate, short, three-nerved. Peduncles erect, pubescent. Leaflets of the calyx acute, having three-nerved margins, membranous. Petals longer than the calyx, obovate, obtuse. Anthers fleshy. Capsule longer than the calyx, cylindrical, three-valved. Seeds almost kidney-shaped, rough, compressed. It flowers from May to August.

This plant does not grow so abundantly or luxuriantly as the "Chickweed," which it somewhat resembles in the habits. It is less troublesome, and is much easier extirpated. It generally yields to the repetitions of the scuffler and the hoe; but where it is very abundant, it may be gathered off the land, as was recommended with "Chickweed."

2. HEDGE MUSTARD,

Or the "Erysimum" of botany, is a weed of much frequency on similar soils with the Wild Mustard, which has been described; and being like it, the two plants are often confounded. The Hedge Mustard belongs to the class and order "Tetradynamia siliquosa" of Linnæus, and the natural order "Cruciferæ" of Jussieu.

Generic character: Calyx—perianth four-leaved; leaflets ovate, oblong, parallel, converging, coloured, deciduous. Corolla four-petalled, cruciform; petals oblong, flat, extremely obtuse at the tip; claws length of the calyx, upright; nectariferous gland double, within the shorter filament. Stamina—filaments six, length of the calyx (of these, the opposite two shorter); anthers simple. Pistil—germ linear, four-cornered, length of the stamens; style very short; stigma headed, permanent, small. Perianth—silique long, linear, strict, exactly four-cornered, two-valved, two-celled. Seeds very many, small, roundish.

Essential character—Silique columnar, with four equal sides. Calyx closed.

The "Erysimum barbarea," or the Winter Cress or Hedge Mustard, has the leaves lyrate, the out-most lobe roundish. Root perennial. Stem a foot or eighteen inches high, smooth, round, deeply furrowed, much branched. Leaves smooth, dark green, having two or three pairs of roundish lobes, connected to a broad foliaceous rib, the extreme lobe much the largest, and either of an oval or blunt rhomboidal figure, slightly indented on the edge; but they vary much in form. Flowers in racemes or thick spikes, at the ends of the stem and branches. Calyx green. Petals yellow, much longer than the calyx. Seeds roughish, finely dotted, and reticulated, twenty in number—ten in each cell.

This plant flowers in May to July. It grows in watery places, on banks of ditches and streams, on walls, and in cultivated fields. The leaves are used as salads, and also boiled as "kale." The taste is mostly bitter and unpleasant; and the whole plant has a nauseous, bitter, slimy flavour. The dark, shining, broad leaves distinguish it from the "Mustards," with which it is frequently confounded. They grow intermixed. The colour of the flowers is similar, and the unaccustomed eye mistakes the one for the other. The lower leaves are lyrate, with the terminal lobe rounded; upper ones obovate, toothed. This characteristic separates it from the "Sinapis." The same means of eradication apply to both plants. An ordinary growth may be overcome by the hoe and the scuffler: a profusion of plants must be pulled by hand, and removed from the ground.

3. COLTSFOOT,

Or the "Tussilago" of botany, is a weed of much frequency on damp, clayey loams, that are adapted for the green-crop cultivation. The plant belongs to the class and order "Syngenesia polygamia superflua" of Linnæus, and the natural order "Corymbiferæ" of Jussieu.

Generic character: Calyx common, cylindrical; scales lanceolate, linear, fifteen or twenty, equal, as long as the disk, submembranaceous. Corolla compound, various; corollets in some are hermaphrodite, and tubular, or only in the disk; females in some none, in others ligulate; proper of the hermaphrodite, funnel-formed; border five-cleft or four-cleft, acute, reflexed, longer than the calyx; females none, or ligulate, very narrow, longer than the calyx, entire. Stamina in the hermaphrodites—filaments five, capillary, very short; anther cylindric, tubular. Pistil in the hermaphrodite—germ short; style filiform, longer than the stamen; stigma thickish: in the females—germ short; style filiform, length of the hermaphrodite; stigma bifid, thickish. Pericarp—none. Calyx scarcely changed. Seeds in the hermaphrodites—solitary, oblong, compressed; down capillary, stipulate: in the females—if any, like the others; receptacle naked.

Essential character: Calyx—scales equal, as long as the disk, somewhat membranaceous; down simple; the receptacle naked.

The common or field species of Coltsfoot is the "Tussilago Farfara." Scape one-flowered. Scaly leaves, cordate, angular, toothletted. Root perennial, creeping horizontally far and wide. Flowers solitary, terminating, yellow, more conspicuous on account of the irradiate than most of the other species. The flowers come up early in the spring, before the leaves, and at some distance from them. They are upright; but as soon as the blossom is past, and the seeds, with their down as yet moist, are enclosed within the calyx, the heads hang down. As the moisture evaporates in ripening, they become lighter, are again erected, and the down expands.

The "Coltsfoot" is often a troublesome weed in moist, stiff, clayey and marly soils that have been overcropped and exhausted. The roots penetrate deeply, and are widely spread; and when drawn, they often break, and sprout again very vigorously. To extirpate the roots of that nature, deep ploughing is the surest way; and the furrow must be comparatively narrow, in order that the roots may not escape unhurt between the furrow-slices. The root being perennial renders attention to the eradication of that part of the plant equally, if not more necessary with the prevention of the seeds being perfected. Both duties being properly executed, the "Coltsfoot" will speedily disappear, the presence of it being a sure mark of bad management.

4. SPEAR THISTLE,

Or the "Carduus" of botany, grows sometimes on corn-fields, but most generally on ditch-banks and sides of hedges. The genus of thistles is one of the most extensive in the vegetable kingdom, and belongs to the class and order "Syngenesia polygamia equalis" of Linnæus, and the natural order "Cinaracephalæ" of Jussieu.

Generic character: Calyx common, ventricose, imbricate; scales very numerous, lanceolate, acuminate, spiny. Corolla compound, tubular, uniform; corollules hermaphrodite, subequal, reflected, the proper one monopetalous, infundibeliform; tube very slender; border erect, ovate at the base, quinquefid; divisions linear, equal, one more deeply serrated than the rest. Stamina—filaments five, capillary, very short; anthers cylindrical, tubular, length of the corolla, five-toothed at the mouth. Pistil—germ ovate; style filiform, longer than the stamens; stigma simple, subulate, naked, emarginate. Pericarp—none. Calyx converging a little. Seeds solitary, obovate, four-cornered, the two opposite corners obliterated; down sessile, very long; receptacle hairy, flat.

Essential character: Calyx ovate, imbricate, with spiny scales; receptacle hairy.

The "Spear thistle," or "Carduus lanceolatus," has the leaves decurrent, pinnatifid, hispid; divisions divaricate; calyces ovate, spiny, villose. Root often biennial. Stem upright, three or four feet high, angular, downy, and sea-green underneath, hairy and deep-green above. Flowers in July. It is often called the "bur thistle." The flowers have the property of curdling milk.

The means of eradication are cutting and pulling the stems, and using the most diligent attention that no seeds be perfected. If cut in the early season, side branches will shoot and perfect seeds, so that a second cutting is required; but if allowed to grow to height, one cutting will be sufficient. Every plant in lanes, road-sides, ditch banks, and in the roots of hedges, must be very carefully destroyed; for the seeds are winged with down, and are easily carried by the wind to distant places, where they alight and grow.

5. FIELD THISTLE,

Or the "Carduus pratensis" of botany, is a species of the thistle genus, and belongs to the class and order last described, and is placed in the second natural section of the plants, having the leaves "not decurrent." The leaves are sessile, pinnatifid, spinuous; stem, panicled; calyces, egg-shaped, slightly spinuous. Down feathery. Root perennial, creeping, tapering, descending into the ground, not easily extirpated. Stems three feet high, erect, round, smooth, many-flowered. Leaves slightly decurrent, alternate, smoothish. Lobes unequal, ciliated, spinuous. Flowers white. Calyx, egg-shaped. Scales, broad, lanceolate, pressed close, woolly at the edges, with a short spreading spine. Down deciduous. Root permanent.

The permanent root remaining in the ground, and sending up flowering stems in succession, is the chief tendency to be guarded against in the "common thistle:" the stems can be kept down by repeated cuttings. In order to destroy the tapering and spreading roots, no process is so effectual as "deep ploughing," executed with a strength of four horses, and the furrow narrow in proportion to the depth, that no roots escape uncut between the furrow slices. This mode of deep and narrow ploughing never fails in completely expelling the thistle as a weed on cultivated grounds.

6. DOCK,

Or the "Rumex" of botany, is a very annoying weed both on cultivated lands and on pastures, in soft damp soils. It belongs to the class and order "Hexandria Trigynia" of Linnæus, and the natural order "Polygoneæ" of Jussieu.

Generic character: Perianth three leaved; leaflets obtuse reflex, permanent. Corolla—petals three, ovate, larger than the calyx, and, like it, converging, permanent. Stamina—filaments six, capillary, very short; anthers erect, twin. Pistil—germ turbinate, three-sided; styles three, capillary, reflexed, standing out between the clefts of the converging petals; stigmas large, laciniate. Pericarp none. Corolla converging, three-sided, inclosing the seed. Seed single, three-sided.

Essential character: Calyx three-leaved; petals three, converging. Seed one, three-sided.

The "Rumex obtusifolius," or "Blunt-leaved dock," is the most common weed. Flowers hermaphrodite; valves toothed; one chiefly graniferous root. Leaves cordate, blunt. Stem somewhat rugged. Root tapering, running deep and straight. Stem three feet high, upright, branched. Racemes nearly upright, furnished with few leaves. Flowers in half whorls, on capillary peduncles, sprinkled near the top with white shining globules, and the pedicels surrounded near the base by an indistinct cartilaginous ring.

The "Rumex acetosa," or the "common sorrel," has a perennial root, running deep into the earth. Stem mostly simple, erect, from one to two feet high. Flowers diœcious; valves, graniferous. Leaves oblong, sagittate. It flowers early in June.

The "Rumex acetosella," or "sheep's sorrel," is less than the common sorrel by half. Root creeping, perennial. Flowers diœcious; valves, grainless. Leaves lanceolate, hastate.

The presence of any plant of the dock genus on arable or pasture lands shows a moisture which requires draining to carry it away, and the appearance of the sorrels indicates a sourness that requires the application of calcareous matters to remove it. And in the case of all permanently rooted plants, deep and clean ploughings are again recommended for the purpose of eradicating them.

The "Dock" ripens an abundance of seeds, which are shed round the parent, not having the means of being dispersed to any distance. The seeds are very tenacious of life, and nothing but burning is a sure destruction of them. The roots are equally tenacious, and require to be removed from the field on being pulled up. The roots send forth new shoots from almost any depth.

7. CORN BINDWEED,

Or the "Convolvulus" of botany, is found occasionally growing among wheat, and twining round the stalks of corn. The plant belongs to the class and order "Pentandria monogynia," of Linnæus, and the natural order "Convolvulaceæ" of Jussieu.

Generic character: Calyx—perianth five cleft. Corolla monopetalous, bell-shaped, or funnel-shaped, plaited; border generally spreading, more or less fine; lobed. Stamina—filaments five, awl shaped, shorter than the corolla, approximating at the base. Pistil—germen superior, roundish; style, filiform; stigma, simple or bifid. Pericarp, capsule surrounded by the calyx, roundish, one, two, three, or four celled; one, two, three, four, or many valved. Seeds one or two in each cell.

Essential character: Calyx five-cleft. Corolla bell or funnel-shaped; stigmas, one or two. Pericarp, a capsule or dry berry. Seeds one or two in each cell.

The calyx is often called "five-leaved," when it is very deeply "five-cleft."

The common field bindweed is a native of Britain, and most parts of Europe. Leaves arrow-shaped; lobes acute. Flowers generally solitary; bracts minute, awl-shaped, remote from the flower. Root perennial, creeping, striking deeply into the ground, not easily extirpated. Stems numerous, angular. Leaves alternate, petioled, smoothish. Flowers flesh-coloured, sometimes white, sweet-scented, opening only in clear weather. Peduncles axillary, generally one-flowered, thickened above. The juice is slighty purgative, and the blossoms give a deep orange or yellow tincture to water, which is heightened by alums and alkalies. It flowers in June and July.

The weed is most common on dry gravelly soils, where it wanders over whole fields, twining round the stalks of the grain, and very much injuring the crop, especially when it has been laid down by heavy rains. The roots run deeply and very widely. It brings plants to the ground, or checks their vegetation by injuring their structure. Being perennial, it must be rooted out by repeated ploughings done in dry weather, and by carefully picking of the roots and burning them. The roots are very vivacious, and the smallest piece left in the ground will spring and rise to the surface.

8. REST-HARROW,

Or the "Ononis" of botany, is sometimes met with on tillage lands, where it forms a weed of a very troublesome nature. The plant belongs to the class and order "Diadelphia decandria" of Linnæus, and the natural order "Leguminosæ" of Jussieu.

Generic character: Calyx—perianth five leaved, almost the length of the corolla; segments, linear, acuminate, slightly arched upwards, the lowest under the keel. Corolla, papilionaceous; banner cordate, striated, depressed at the sides more than the other petals; wings ovate, shorter by half than the banner; keel acuminate, as long or longer than the wings. Stamina—filaments ten, connate in an entire cylinder; anthers simple. Pistil—germ oblong, villose; style simple, rising; stigma, blunt. Pericarp, legume rhomb-shaped, turgid, sub-villose, one-celled, two-valved, sessile. Seeds few, kidney form.

Essential character: Calyx five parted, with linear segments; banner striated; legume turgid, sessile. Filaments connate, without a fissure.

There are thirty-eight species of this genus of plants, of which only *one* is found in Britain, and is called the common rest-harrow, or cammock, and by botanists the "Ononis arvensis." It is found on barren sandy grounds, and on way-sides, and flowers from June to September. The flowers are nearly sessile, and mostly solitary. Stem hairy. Branches at length spinous. Leaves generally simple, entire towards their base. Root perennial, woody, brackish. Stems rather erect, or procumbent, annual, round, woody, leafy, hairy, spinous when old. Leaves alternate, stalked, elliptically wedge-shaped, linear, roughish, the lower ones often ternate. Stipules very large, ovate, embracing the stem, toothed. Flowers axillary, solitary, slightly stalked, elegantly rose-coloured. Seeds dotted with tubercles.

Some botanists make a distinction between the "Ononis arvensis" and the "Ononis spinosa," as being distinct species; but Mons. Villars does not distinguish them, alleging that the spines appear with the age of the plant, and growing stronger as the plant grows older. This observation removes much useless reasoning on minute differences.

The Rest-harrow has a strong creeping root, which spreads far in the ground. There is little danger from the seeds; and the safest way of extirpating the roots is to pick them off the land by hand, after being well shaken by the harrows in dry weather. They may be burned in a heap, or rotted with earths into a compost for top-dressing. This weed is not difficult of extirpation—a well-executed fallow will banish it for ever; and the appearance of it in modern agriculture shows that there is something wrong in the performance of the art.

9. FERN,

or the "Pteris aquilina" of botany, is sometimes found as a weed on corn lands. It belongs to the class and order "Cryptogamia Filices" of Linnæus, and the natural order "Filices" of Jussieu.

Generic character: Fructification in an uninterrupted marginal line; involucre from the margin of the frond, turned in, uninterrupted, separating on the inner side.

The Common Fern or Brake is the original type of the genus, and is the "Filix scemina" of old writers. The frond is in three deep divisions; branches doubly pinnate; leaflets crowded, lanceolate, acute, the upper ones confluent. The fronds are annual, originating from a perennial, creeping, scaly root, and rise, according to the soil, to the height of two to five feet. They are rigid and harsh, colour light green, and spread in a handsome, partly horizontal posture, being regularly compounded in an almost pectinate manner. The fructifications are rough, tomentose, rufescent; parallel lines run along the margin of the pinnules, which are rolled back very much, so as almost to cover the capsules when ripe.

The "Braken," or common fern, is a hardy perennial plant, tenacious of growth, and striking a tap-root into the ground beneath the reach of the plough, which shoots up vigorously when the sun has become powerful; it prevails largely and strongly on some deep, dry, hazel, loamy soils. The roots may be drawn after soaking rains, and the land must be very deeply ploughed; for when the plant has been long established, it requires much pains and attention to get quit of it.

10. HORSETAIL,

or the "Equisetum" of botany, is not unfrequently found as a weed on soft moist soils. It belongs to the class and order "Cryptogamia Filices" of Linnæus, and the natural order "Filices" of Jussieu.

Generic character: Fructifications disposed into a long, ovate, oblong spike, each orbiculate, gaping at the base, with several valves connected by a flat shield-shaped top.

The roots are perennial and creeping. They are leafless herbs, with a hollow streaked stem, either simple or branched—the branchlets usually disposed in whorls; it is jointed, and the joints are surrounded with a toothed sheath.

The "Corn Horsetail," or the "Equisetum arvense," has the fruit-bearing scape naked, the barren scape leafy. The naked flowering stems appear early in the spring, and soon decay; they are the thickness of a large wheat straw, a hand's breadth or more in height, upright, yellowish, with from two to five joints, covered with membranous ribbed sheaths, divided at the top into numerous segments or teeth. It grows in corn fields of a damp nature, flowering in March, April, and May. The country people call it "horse-pipe" and "snake-pipe." The presence of it is supposed to indicate subterraneous flowing waters or springs. It is a troublesome weed, and difficult to extirpate. The produce of seeds being small, the chief attention must be directed to the destruction of the root by the ploughings of the land being executed deeply, with a narrow furrow, and with sharp irons on the plough, in order that the roots may not escape being cut.

11. MOUSE-EAR,

or the "Cerastium" of botany, is often found infesting light soils. It has somewhat the habit of "chickweed," but is of a duller appearance. The plant belongs to the class and order "Decandria Pentagynia" of Linnæus, and the natural order "Caryophylleæ" of Jussieu.

Generic character: Calyx—perianth five-leaved; leaflets ovate, lanceolate, acute, spreading, permanent. Corolla—petals five, bifid, obtuse, erect, expanding, length of the calyx. Stamina—filaments ten, filiform, shorter than the corolla, the alternate one shorter; anthers roundish. Pistil—germ ovate; styles five, capillary, erect, length of the stamens; stigmas obtuse. Pericarp—capsule ovate, cylindric or globular, obtuse, unilocular, gaping, with a five-toothed lip; seeds very many, roundish.

Essential character: Calyx five-leaved; petals bifid; capsule unilocular, gaping at the tip; orifice toothed.

The "Corn Mouse-ear," or the "Cerastium arvense," has the root perennial, creeping; stems four or five inches high, decumbent, forming thick tufts, pubescent; leaves linear-lanceolate, often densely pubescent, sometimes only ciliated at the base; flowers large, white leaflets of the calyx egg-shaped, obtuse, scarious at the edges; petals heart-shaped, veined; capsule cylindrical, straight, the length of the calyx orifice, with ten teeth.

This weed grows chiefly on gravelly and chalky soils. Nature has provided annual plants with an abundance of seeds, by which to propagate their kinds; and perennial plants have the property of propagation chiefly in the roots; and some plants are provided very largely with both qualities. In the eradication of perennial plants, where the roots are so very ready to retain life, the most effectual method is to gather by hand, and carry the plants off the field after being cut by the hoe, especially when the number is large, as a multitude of roots seldom fail in catching hold of the earth, and thus continue their existence, though the bearing of seeds has been prevented.

12. MINT,

or the "Mentha" of botany, is a frequent weed on moist soils. It belongs to the class and order "Didynamia Gymnospermia" of Linnæus," and the natural order "Labiatæ" of Jussieu.

Generic character: Calyx—perianth inferior, of one leaf, tubular, erect, with five nearly equal teeth, permanent. Corolla—of one petal, erect, tubular, somewhat larger than the calyx-limb, in four deep, nearly equal segments, the uppermost only being rather the broadest, and cloven. Stamina—filaments four, awl-shaped, erect, distant, the two nearest ones longest; anthers roundish. Pistil—germen superior, four-cleft; style thread-shaped, erect, longer than the corolla; stigma in two divaricated divisions. Pericarp none, except the permanent straight calyx; seeds four, small, generally abortive.

Essential character: Calyx five-cleft, nearly equal; corolla nearly equal, four-cleft, its broadest segment cloven; stamens erect, distant.

The herbage, and even the flowers, of mint abound with resinous dots, the seat of an essential oil, on which the warm and aromatic qualities of the plants depend. The genus is one of the most natural possible, and well marked in habit and character. The herbage is generally more or less hairy.

The "Corn Mint," or the "Mentha arvensis," has the flowers whorled; leaves ovate; stem much branched, diffuse. Leaves inclining to elliptical, obtuse, pale, clothed with rather rigid prominent hairs. Flower-stalks shortish, round, generally smooth, sometimes furnished with a few spreading or slightly deflexed hairs. Calyx shorter, more bell-shaped, and more broadly toothed than in any of the foregoing, and essentially characterized by being clothed all over with horizontally spreading hairs. Flowers reddish lilac, externally hairy.

This plant grows abundantly in corn-fields, where water stagnates in winter, especially on a sandy or gravelly soil. It is often a very troublesome weed, because of the widely-creeping nature of the root; and its turgid, fleshy shoots are well calculated to retain life in a soil that fluctuates as to humidity. The roots being perennial, must be picked by hand, and carried from the field, each time when the land is ploughed, harrowed, and rolled. The roots are very tenacious of life, and must be carefully removed.

13. OAT GRASS,

Or the "Holcus avenaceus" of botany, is most troublesome on the best arable lands. It is the "Avena elatior" of the old botany; but has been latterly placed as a Holcus, from a near affinity to that genus, with an avenaceous or oat-like appearance. The plant belongs to the class and order "Triandria Digynia" of Linnæus, and to the natural order "Gramineæ" of Jussieu.

Generic character: Calyx—glume of two valves, erect, beardless, ovate, containing two florets, one of them elevated on a stalk. Corolla of two valves, the lower or outer one largest, awned at the back in the least perfect floret. Nectary a cloven membranous scale. Stamina—filaments three in each floret, capillary, rather short; anthers long, linear, cloven at each end. Pistil—germen ovate; styles two, capillary, diverging; stigmas oblong, feathery. One floret has either no pistil, or only an imperfect one. Pericarp—none, except the permanent glumes. Seed solitary, ovate, attached to the hardened corolla.

Essential character: Calyx of two valves, two-flowered, one floret with an imperfect germen. Corolla of two valves, the outer one awned.

The species "Avenaceus" has the calyx glumes unequal, smooth; male floret, with a bent awn; root knotty, perennial; stems a yard high; leaves darkish green, rough, and rather harsh; stipula short, abrupt, minutely toothed; panicle half whorled, the branches consequently leaning one way. Flowers scariose, shining, not downy. Anthers purple, pendulous. The male floret has the rudiments of a germen, and is always conspicuously awned; the other is but slightly elevated. When the land is rich, this plant grows luxuriantly, and acquires more joints and bulbs, and has been called "Holcus bulbosus," though only a variety of the plant now described.

This grass flowers in June and July, and forms a large part of the weeds which pass under the general denomination of "couch" and "quickens." No weed is more troublesome to the farmer on the better turnip soils, and on the more loamy clay fallows. The root is perennial, and composed of knobs or bulbs that are joined together at distances by intervening threads, and from each bulb shoots proceed, which circumstance renders the extirpation of the weed to be very difficult and tedious. Repeated ploughings and harrowings of the land become necessary, and then a very careful hand-picking of the roots of the plant, after they have been well shaken into view by the action of the implements. On stiffish soils, which hold the weed tightly in their texture, the sharp irons of the plough are very apt to cut the fibres into small pieces, which very much increase the difficulty of getting the land cleared of the weed. Accordingly on all lands of which the degree of mellowness admits the action of a grubbing scarifier, the round tines of that implement tear out, and drag to the surface, the roots and fibres of the plant, without cutting or breaking them; at the same time the ground is better pulverized. The roots are very tenacious of life, and no degree of arid exposure will destroy the vital principle. Decomposition in a heap, along with other earthy matters, requires to be very minutely inspected at each turning over of the heap; for some roots are very apt to escape on the outside of the compost, and which being carried to the land, will immediately grow, and multiply very fast. Even the burning of the roots in heaps on the field is not thoroughly safe; for the outside may escape ignition, and grow as before. The most effectual method is to carry the roots from the field at once, and to lay them in some waste corner, where they they may be burned at leisure, or mixed and prepared in compost by a lengthened attention.

14. WHEAT GRASS,

Or the "Triticum" of botany, is a most pernicious weed. The plant belongs to the class and order "Triandria Digynia" of Linnæus, and the natural order "Gramineæ" of Jussieu.

Generic character: Calyx—a common receptacle, elongated into a spike, glume two-valved; subtriflorous; valves ovate, bluntish, concave. Corolla —two-valved, nearly equal, size of the calyx; exterior valve ventricose, blunt, with a point; interior valve flat. Nectary two-leaved leaflets, acute, gibbous at the base. Stamina—filaments three, capillary; anthers oblong, forked. Pistil—germen turbinate; styles two, capillary, reflexed; stigmas feathered. Pericarp — none. Corolla fosters the seed, opens and drops it. Seed one, ovate, oblong, blunt at both ends, convex on one side, grooved on the other.

Essential character: Calyx two-valved, solitary. Subtriflorous, or many-flowered, on a flexuose toothed rachis. Corolla blunt, with a point.

This genus comprehends all the varieties of the cultivated wheats, and the annual and permanent wheat grasses. The species now mentioned as a weed is the "Triticum repens" of botany, or the creeping wheat-grass, and known by different names, as quick, quitch, twitch, couch, or dog's-grass, all evidently derived from quick, which signifies "living," in allusion to the very vivacious nature of the root. Calyx awl-shaped many-ribbed, five-flowered. Florets pointed; leaves flat; root creeping. Flowers in summer and autumn.

The roots have been dried, and ground into meal, and made into bread, in years of scarcity. The taste of the dried roots is sweet, and they are sold as food for horses. Cows, sheep, and goats also eat them. Dogs eat the leaves, to excite vomiting. The stems are two feet high, slender. Herbage green.

The long and deeply-creeping roots are, of all weeds, the most difficult to be extirpated. The root is regularly jointed, and from each joint the shoots proceed, which throw up the flowering stems. The recommendation given in the former weed is now repeated, that the land be repeatedly grubbed and scarified in contrary and cross directions, in order to drag the weeds "entire" to the surface, and then to be carried from the field, in order to be burned or decomposed in an earthy mass. The roots are vivacious beyond any example, and require the most minute care that every twig of them, however small, be most carefully picked from the land and removed.

The roots of the common grasses become weeds on arable lands, and farmers designate them all by the common name of "quickens," or "couch grass." Next to the two grass weeds that have been mentioned, the roots of the agrostis family form the weed of the greatest abundance on damp loams, where they grow very vigorously. The roots are black in colour, fibrous, and creeping, and throw out shoots from the joints, and are very tenacious of life. They are most generally called "bent grass."

The "wild oat," or "haver," the Avena fatua of botany, is not uncommon as a weed on badly cultivated soils. Being perennial, and having a creeping root, it can only be reduced and banished by very careful fallowing of the land, and by picking off every root; and all root plants, or those that are propagated chiefly by the roots, are only to be eradicated by that process.

15. COTTON GRASS, HARE'S TAIL, OR MOSS CUPS,

The Eriophorum of botany, grows in bogs or boggy meadows. The plant belongs to the class and order Triandria Monogynia of Linnæus, and the natural order Cyperoideæ of Jussieu.

Generic character: Spike, or rather catkin, imbricated every way: scales ovate, oblong, flat, slightly inflexed, pointed, membranous, loose, separating the flowers. Corolla—none. Stamina—filaments three, capillary; anthers erect, oblong. Pistil—germen superior, very small; style, thread-shaped, the length of the calyx scale; stigmas three, longer than the style, reflexed. Pericarp none; seed triangular, pointed, surrounded at the base with numerous hairs, longer than the spike.

Essential character: Glumes chaffy, imbricated every way. Corolla—none. Seed one, invested with very long hairs.

The Eriophorum vaginatum, the mountain or single-spiked cotton grass, has the culms sheathed, spike scariose; root leaves obscurely three-cornered, sharp, streaked on two sides; convex on one side, flat on two sides. Flowers in April and May. Sheep are very fond of it. Ray calls it "hare's tail rush," and in Westmoreland it is called "moss crops." It is a native of bogs or boggy pastures, in cold barren situations. The Eriophorum angustifolium, or narrow-leaved cotton grass, is very similar to this plant, and is often confounded with it. They grow in the same situations, and produce nearly similar flowers at the same time.

The presence of this plant, as a weed, is a certain indication that drainage has been neglected, and that it is of course necessary to be done, in order to restore the meadow to the proper state of good herbage. Top-dressings, with well prepared composts, must be applied at the same time.

16. COW WEED,

"Wild cicely," "wild chervil," is the Chærophyllum of botany, and a common weed in orchards and pastures. The plant belongs to the class and order Pentandria Digynia of Linnæus, and the natural order Umbelliferæ of Jussieu.

Generic character: Calyx, umbel universal, spreading, partial, nearly equal in the number of its rays. Involucre—universal, generally none; partial, five leaved, or more. Leaflets lanceolate, concave, reflexed, about the length of the partial umbel. Perianth proper, scarcely discernible. Corolla universal, nearly uniform; florets of the disk often abortive. Proper petals five, inflexed, heart-shaped, with an inflexed point, flattish, outer ones a little larger. Stamina—filaments five, simple, the length of the little umbel; anthers roundish. Pistil—germen, inferior; styles two, reflexed; stigmas—obtuse. Pericarp—none. Fruit oblong, acuminate, even, divisible into two. Seeds two, oblong, attenuated upwards, convex on one side, flat on the other.

Essential character: Involucre reflexed, concave. Petals inflexed, heart-shaped. Fruit oblong, even.

The Chærophyllum sylvestre, or the "smooth cow-parsley," has the stem striated, slightly swelling below the joints. Root perennial, spindle-shaped, slightly milky, but little branched. Stem about three feet high, erect, branched, leafy, round, downy towards the bottom, almost always void of pubescence above. Leaves triply pinnated, deeply cut, rough at the edge; petioles short, dilated, ribbed. Flowers whitish, umbels erect, terminal. Leaves of the partial involucre, egg-shaped, membranous, fringed with thick-set white hairs. Petals more or less emarginate, rarely entire. Fruit oblong, somewhat elliptical, roundish, very slightly striated, quite smooth. Flowers in April and May, and grows very common in meadows and pastures in most parts of Europe, and always indicates a rich soil. Grazing animals are indifferently fond of eating it. It flowers and ripens the seeds before any of the proper grasses.

This plant may be weakened and destroyed by close cutting the early growths. The root stems may be split, and salt pushed down the incisions, where the plants are very strong.

17. RUSH,

Or the Juncus of botany, is frequently found as a weed on wet pastures and meadows. The plant belongs to the class and order Hexandria Monogynia of Linnæus, and the natural order Junci or Junceæ of Jussieu.

Generic character: Perianth of six oblong, pointed, permanent leaves; inferior. Corolla—none. Stamina—filaments six, in the common rush only three, capillary, very short; anthers oblong, erect, the length of the perianth. Pistil—germen superior, pointed, triangular; style short, thread-shaped; stigmas three, long, thread-shaped, downy, inflexed. Pericarp—capsule invested with the calyx, triangular, of three more or less completely divided cells, with three valves, the partitions from their centre. Seeds various in number, rarely solitary, roundish.

Essential character: Calyx of six leaves, permanent. Corolla—none. Capsule superior, of two valves, with one or two cells. Seeds several. Stigmas three.

The "common rush," or Juncus conglomeratus, is triandrous, and belongs to the first section, or plants that have a leafless stem, the culm being naked and stiff, and the head lateral. Root perennial, horizontal, close, covered with ovate scales; fibres filiform, very long; culms from one to two feet in height, upright, round, smooth; sheaths at the base, striated, blunt, leafless, awned, the uppermost three times as long as the rest. Root leaves few, very like the culms. Head of flowers roundish, solitary, seldom two together, from the fissure of the culm bursting out below the top.

The rush plants grow on soils varying from the poorest gravelly clays to the best and deepest loams, and always indicating an excess of moisture. Draining of the land is the first step in remedy, and to be assisted by top-dressings of ashes, and other earthy matters. The roots may also be dug by the spade, and reversed in the pit, when they generally die, and give place to better herbage.

18. TANSY,

Or the Tanacetum of botany, is sometimes found as a weed on very good meadows. The plant belongs to the class and order Syngenesia Polygamia superflua of Linnæus, and the natural order Corymbiferæ of Jussieu.

Generic character: Calyx common, hemispherical, imbricate; scales acute, compact. Corolla compound, tubular, convex. Corollets hermaphrodite, numerous, tubular in the disk; females, some in the ray. Proper of the hermaphrodite, funnel-form, with a five-cleft, reflexed border; female, trifid, more deeply divided inwardly. Stamina in the hermaphrodite—filaments five, capillary, very short; anthers cylindric, tubular. Pistil in the hermaphrodites—germ oblong, small; style filiform, the length of the stamens; stigma bifid, revolute. In the females—germ oblong; style simple; stigmas two, reflexed. Pericarp none; calyx unchanged;

seeds solitary, oblong; down slightly margined. Receptacle naked.

Essential character: Calyx, imbricate, hemispherical. Corolla, rays obsolete, trifid, sometimes none; and all the florets hermaphrodite. Down submarginate. Receptacle naked.

The " common tansy," or the Tanacetum vulgare, has the leaves bipinnatifid, sharply serrated, naked. The root is fibrous and creeping, and spreads to a great distance. It is bitter, and has a strong aromatic smell. Stems upright, from two to four feet high. Flowers from June to August, and compose a large, flattish, terminal, golden corymbus.

This weed is a native of most parts of Europe, and grows mostly on the banks of rivers and low places that are moderately swampy. As it propagates chiefly by the roots, they must be dug by the spade, or pulled by the weeding spit or tongs. The spade will be the most effectual method of destruction, as the stem and roots may break in being pulled, and the remnant will grow afresh. When dug, the fibrous root must be well shaken from the earth, and carried from the field; the soil being returned into the cavity made by the excavation.

19. YARROW,

" Sneezewort," or the Achillea of botany, is a common plant on some dry warm pastures. The plant belongs to the class and order Syngenesia Polygamia superflua of botany, and the natural order Corymbiferæ of Jussieu.

Generic character: Calyx common, obovate, imbricate; scales ovate, acute, converging. Corolla, compound, radiate. Corollets—hermaphrodite tubular in the disk; females, ligulate, five to ten in the ray. Proper of the hermaphrodite—funnel-shaped, five-cleft, spreading; female, obcordate; spreading, trifid, the middle cleft less than the others. Stamina in the hermaphrodites—filaments five, capillary, very short; antheræ cylindrical, tubular. Pistil in the hermaphrodites—germ small; style filiform, the length of the stamens; stigma obtuse, emarginate. In the females—germ small; style filiform, the same length as in the others; stigmas two, obtuse, reflex. Pericarp none. Calyx, scarcely changed. Receptacle, filiform, elongate at the disk of the seeds, ovate, twice the length of the calyx. Seeds, solitary, ovate, furnished with flocks, but having no down. Receptacle chaffy, elevated; chaffs, lanceolate the length of the florets.

Essential character: Calyx, ovate, imbricate. Florets of the ray about four. Down none. Receptacle chaffy.

Most of the plants of this genus are hardy, herbaceous, fibrous-rooted perennials, with the flowers commonly in corymbs at the ends of the stalk and branches; the ray in some yellow, in others white, in a few purple. The leaves in many of the species are pinnate, bipinnate, or super-decompound; in a few they are simple. Only two species are natives of Britain in the Achillea millefolium or "common yarrow," and the Achillea ptarmica or " sneezewort." The former has the leaves bipinnate, naked, divisions linear, toothed; stems furrowed towards the top. It flowers from June to September, and grows abundantly on pastures and on road-sides. The medicinal qualities are yet allowed, and probably the plant may be regarded rather useful as a medicine than noxious as food. The root being perennial and creeping, the only method of extirpation is to raise roots by hand labour with the three-pronged fork.

The Achillea ptarmica flowers in July and August, and a double variety of it forms the " bachelor's buttons" of the garden. It grows very commonly in meadows, by the sides of ditches, in moist woods, and shady places. To eradicate it, the roots must be raised with forks by hand labour.

20. PILEWORT,

Or the Ficaria of botany, abounds as a weed in shady moist grounds. It is easily known by its tuberous roots. Leaves cordate, shining. Stems many, leafy, red at bottom, four inches long. Flowers upright. Seeds sub-ovate.

The " pilewort" often occupies much room, and chokes other plants which grow near it; and not being eaten by cattle, it should be extirpated. Coal and wood ashes are very effectual in destroying it. The general effect of top-dressing is to kill succulent plants, and encourage the fibrous and gramineous. In the same way, calcareous matters induce the growth of clovers, and all surface manures banish the coarser plants and substitute those of better quality. This fact is every day apparent.

21. CUD WEED,

Or the Gnaphalium of botany, is sometimes seen on pastures, where the sown grasses have missed. The plant belongs to the class and order Syngenesia Polygamia superflua of Linnæus, and the natural order Corymbiferæ of Jussieu.

Generic character: Common calyx, imbricated, rounded. Scales numerous, the marginal ones rounded, scariose, coloured. Corolla—compound florets of the disk tubular, funnel-shaped, in five equal reflexed marginal segments: some female ones without a corolla, are often intermixed towards the margin. Stamina in the perfect florets—filaments five, very short, capillary; anthers forming a cylinder. Pistil in the same florets—germen ovstyle thread-shaped, the length of the stamens; stigma cloven. In the female ones the same. Pericarp none, except the permanent shining calyx. Seeds in both kinds of florets alike, solitary, oblong, small, crowned with capillary or feathery down. Receptacle naked.

Essential character: Receptacle naked. Down capillary, or feathery. Calyx imbricated, its inner scales rounded; scariose coloured.

This weed is not very abundant, and is extirpated without very much difficulty by cutting the stems below ground with a narrow spade that is made for the purpose of cutting large roots. The root being comparatively small may be cut, and not dug as the large roots of the tansy and groundsel; only care must be used that the cutting is effectual of the main stem below the chief fibres, which may again revive any stem left, and produce plants.

22. MARSH MARIGOLD,

Or the Caltha palustris of botany, often occupies much space on damp meadows. The plant belongs to the class and order Polyandria Polygynia of Linnæus, and the natural order Ranunculaceæ of Jussieu.

Generic character: Calyx none. Corolla—petals five, ovate, flat, spreading, deciduous, large. Stamina—filaments numerous, filiform, shorter than the corolla; antheræ compressed, obtuse, erect. Pistil—germ superior, five to ten, oblong, compressed, erect; styles none; stigmas simple. Pericarp—capsules many, short, acuminate, spreading, one-celled, two-keeled, gaping in the superior suture. Seeds many, ovate, or ovate-oblong, smooth, affixed to a superior suture in a double row.

Essential character: Calyx none. Petals five, nectary none. Capsule general, many seeded.

There is only one species of the genus, or the Caltha palustris, called "marsh marigold," or "meadow bowls," or "water blobs." The root is perennial. Stems several, almost upright, about a foot high, hollow, nearly round, smooth, branched, purple at bottom. Radical leaves on long petioles, cordate-reniform, smooth, shining, and notched or crenated, sometimes scalloped, sometimes entire. Stem-leaves nearly sessile, more pointed at top, and sharply crenated. Stipules brown, membranous, and withering. Branches dichotomous. Peduncles one-flowered, upright, grooved. Seeds beautiful, at bottom of an olive, and at top of a reddish colour. It flowers in March and April, and so early as February. The plant is disagreeable to grazing animals, and should be rooted out by the means recommended for the last weed.

23. NETTLE.

Or the "Urtica" of botany, often grows as a weed, in tufts, on good pastures. The plant belongs to the class and order "Monœcia tetrandria" of Linnæus, and the natural order "Urticæ," of Jussieu.

Generic character: Male calyx—perianth of four roundish, concave, obtuse leaves. Corolla—petals none; nectary, the rudiments of a germen, central, small, pitcher-shaped, undivided, tapering at the base. Stamina—filaments four, awl-shaped, spreading, the length of the calyx, and opposite to its leaves; anthers of two globular cells. Female generally on the same plant. Calyx—perianth of two ovate, concave, erect, permanent valves. Corolla—none. Pistil—germen superior, ovate; style none; stigma downy. Pericarp—none, except the closed calyx. Seed solitary, ovate, compressed, blunt-edged, polished.

Essential character: Male calyx of four leaves. Corolla—none. Rudiment of a germen cup-shaped. Female calyx of two leaves. Corolla—none. Seed one, superior, polished.

The "Common Stinging-Nettle," or the "Urtica dioica," has the leaves opposite, heart-shaped, sharply serrated. Stipulas ovate, distinct, spreading. Clusters much branched, in pairs, longer than the foot-stalks, mostly dioicous. The root is perennial, and extensively creeping. The stems are two or three feet in height. Every part is armed with stings.

Where nettles grow in pastures, the roots must be very carefully raised by spade or fork, and burned. The weed is not difficult of extirpation, and the presence of it shows the most careless neglect.

24. DANDELION,

Or the "Leontodon" of botany, is a very disagreeable plant, though common on good lands in most districts. The plant belongs to the class and order "Syngenesia Polygamia æqualis" of Linnæus, and the natural order "Cichoraceæ" of Jussieu.

Generic character: Common calyx—imbricated, oblong; its interior scales linear, parallel, equal; outer scales fewer in number, often reflected at the base. Corolla—compound, imbricated, uniform, the florets hermaphrodite, numerous, equal, each of one petal, ligulate, linear, abrupt, with five teeth. Stamina—filaments five, capillary, very short; anthers united into a cylindrical tube. Pistil—germen nearly ovate; style thread-shaped, as long as the florets; stigmas two, revolute. Pericarp—none, except the oblong, straight, at length reflexed calyx. Seeds solitary, oblong, rough; down capillary, stipitate. The receptacle naked, dotted.

Essential character: Receptacle naked, calyx dotted, imbricated with rather lax scales; down stalked, hairy.

The "Common Dandelion," or the "Leontodon taraxacum," has the outer scales of the calyx reflexed; leaves, lion-toothed, smooth; flowers from April to July; the root is deep and perennial, and very branching; leaves radical, runcinate, toothed, of a bright green colour, smooth; flower stalks simple, longer than the leaves, hollow, brittle, milky, and single-flowered; flower terminal, large, golden-coloured, closing in the evening; styles hairy; seeds obovate, furrowed, bearing on a long footstalk a tuft of simple radiated down. The whole herb is milky and bitter.

The dandelion is a troublesome, though handsome weed. Goats eat it, swine devour it greedily, sheep and kine are not fond of it, horses refuse it: small birds are fond of the seeds. The young leaves are used in salads, and the plant is diuretic in quality; hence it may be useful in pastures. It is coarse, but good in hay with grasses. The eradication is effected as in the case of the last two-mentioned weeds: the roots being smaller and more frequent, the digging may be tedious, and heavy top-dressing of the surface, with composts, will be more advisable, in order to banish the succulent herbs, and bring into use the gramineous and fibrous plants. Where the plants of dandelion are few and large, digging may be the resort of destruction; where thickly planted on the ground, top-dressing will be adopted.

25. GARLICK,

Or the "Allium" of botany, is frequently found as a weed on good pastures. The plant belongs to the class and order "Hexandria Monogynia" of Linnæus, and the natural order "Asphodeleæ" of Jussieu.

Generic character: Calyx — spathe common, roundish, withering, many-flowered. Corolla—petals six, oblong. Stamina—filaments six, subulate, often the length of the corolla; antheræ oblong, upright. Pistil—germ superior, short, bluntly three-corned, the corners marked with a line; style simple; stigmas short. Pericarp—capsule very short, broad, three-lobed, three-celled, three-valved. Seeds few, roundish.

Essential character: Corolla six-parted, spreading; spathe many-flowered; umbel heaped; capsule superior.

The "Great Round-headed Common Garlic," or the "Allium ampeloprasum," flowers in July and August. Umbel globose; stamens three; crisped petals, with a rough keel; stem one foot or more in height, having leaves at the bottom, glaucous and succulent; the spathe is conical, one-leaved, and deciduous. It flowers in a close ball or peduncles, that are about an inch in length. It is perennial, and communicates its flavour to the milk and butter of cows that eat it. It is not *singly* liked by any animal, but is eaten in mixture with other plants.

The most effectual means of extirpation is by raising the roots, by a spade or fork, and destroying them. The occurrence is not frequent of garlick as a weed, and the notice of it is rare: warm, dry, deep soils can only maintain its growth, which is easily annihilated by the digging and destroying of the roots and stem.

(To be continued.)

STOCKING FARMS WITH IMPLEMENTS AND MACHINERY.

During our excursion in the North lately, we were informed of some Scotch farmers who, having taken farms in the south-west of England, are very carefully bringing with them their implements and machinery, not being aware of the possibility of getting so good a supply elsewhere. The progress of mechanical science, it would appear, is less in the districts where they have taken farms than in those which they have just left. And although they examined farms to let in other districts of this country, yet they met with nothing calculated to change the course they have taken. There cannot be a doubt, however, from what we saw, but they will soon find reason to change their opinions, the moment they make themselves acquainted with the mechanical resources of our great implement makers; but when stocking their farms they saw nothing to equal what they have brought from the North. Nor was our informant any better acquainted with our progress in mechanical science; for when we told him that his friends might have done something more than saved the expense of carriage, he would not believe it: thus confirming in his conduct the truth of the old saying, that "seeing is believing, with farmers."

It cannot be denied that we are somewhat partial in the use of our improved implements and machinery, especially corn and manure drills, turnip and chaff cutters, &c. Nationally speaking, we have still, for instance, English farming, Scotch farming, and Irish farming, differing from each other in the use of them. To account satisfactorily for this diversity is no easy task. The shortest way is perhaps to attribute so much to soil, climate, and capital, and to give local custom and habit credit for the balance.

When so much is being said of the statistics of corn, it is to be hoped the statistics of machinery will not be neglected. It would be no less interesting than useful to know how much machinery every farmer brought to bear upon the soil; its power compared with the brute force of primitive times, when comparatively no machinery was used; the amount of produce and population of the respective periods; and the probable results were the most improved machinery universally used. If we only compare the amount of manual labour or human toil applied to the soil about the middle of the last century, and its results, with the labour and produce of the present time, a difference will be found indicative of no ordinary benefits resulting from the use of improved machinery; and when we calculate how small an area is yet subject to the mechanical progress, the prospects before us must appear more than flattering to the political economist. No better index, in fact, could be had to the prosperity of British agriculture than the annual statistics of her implements and machinery, while it would induce incoming tenants to make the best selection of implements and machinery.

There is at present a strong inclination to throw aside the above nationalities in farming, and to adopt a uniform practice, so far as soil, climate, and local circumstance will permit; and this is more particularly the case in reference to machinery. In England, for example, the old vulgar antipathy to everything Scotch is fast disappearing, while in Scotland the aversion to English machinery is as rapidly sharing a similar fate. Ireland, again, whose agriculture has been so long a stumbling-block to her prosperity, appears at the present time more willing to embrace mechanical progress than either of her rivals, and from the natural fertility of her soil, she may soon leave them behind, unless they take care of themselves.

Scotland, perhaps, has during the last ten years experienced more difficulty in keeping pace with the march of progress, in this respect, than England. This has arisen partly from the character of her soil, climate, and husbandry, and partly from the want of mechanical information; the education afforded at her parochial schools, where the majority, whether farmers' sons or implement makers, are educated, being defective on this head. Our northern provinces, for example, are already behind in the use of corn and manure drills, turnip and chaff cutters, &c., &c. How is the fact otherwise to be accounted for?

With regard to the soil, a hilly country may be said not to be so well adapted for sowing-machines of any kind, as a comparatively level one. Now the North is peculiarly a hilly country, though there is not that unlevelness in the fields which its alpine character would lead one to expect. At the same time there are many instances where our heavy corn drills could not be very easily used, even with four horses; and when four horses cannot perform what one of the horsemen can easily do, the economy of such a machine, whether in sowing corn or dressing with guano, becomes more than problematical, especially in the eyes of those who have no experience of its real advantages, thus preventing its adoption.

The less propitious climate of the North, again, in the absence of thorough draining, has thrown many peculiar obstacles in the way of either using sowing machines, or chaff and turnip cutters. Winter wheat, for example, is frequently sown by the hand, when machines could not enter the field, the horses going in the furrows while harrowing. There the fine autumns of the South are not enjoyed for getting in wheat, while the harvest is later and the winter-day shorter. Spring is also later, and more fickle; consequently when a good sowing season arrives, four horses cannot always be spared for sowing, the whole being required for the harrows, and more, if they could be had. On small farms we have seen cows harrowing, and fattening bullocks working the thrashing machine. These latter are, doubtless, exceptions; but at the same time they are facts indicating a pressure of circumstances. As to chaff-cutters, there being no meadow hay for mixing, or, indeed, hay of any kind to any extent, and more of the straw being injured by the weather, the economy of cutting it into chaff is a question which experience has not yet solved; while such facts throw difficulties in the way of its solution not experienced in the South. Early frosts, again, before turnips are fit for storing, render that work more difficult to be performed successfully, and hence have given rise to practices somewhat at variance with the use of turnip-cutters. Turnips, for instance, are pulled and taken from the field during winter and spring as required, and given to cattle, along with the tops, without cutting. The loaded cart, as it comes from the field, is often taken to the straw-yard, and emptied into a "turnip crib," out of which the turnips are consumed by store cattle.

But, perhaps, the greatest obstacle to the introduction of such machines has been the peculiar system of husbandry in the North, usually styled "Scotch farming." Landlords, for example, discovered there long ago the best form of lease, mode of cropping, construction of farm buildings, and so forth (?). Leases and regulations for the management of landed estates were not only printed for the sake of economy, but stereotyped for the advantage of posterity in all time coming! To these things tenants mutually concurred. Lands were consequently subdivided into the necessary number of fields, and cropped accordingly; labourers' cottages erected, and labourers themselves engaged for long terms, imposing upon field operations many restraints, and hence on machine labour. Farm buildings sprung up in every province with as much similarity in form as mushrooms in a dunghill. Barns, including thrashing-machines, byres, stables and cart-sheds, were respectively as like each other as carts, ploughs, harrows, rollers, &c. In many parishes, if not the majority, a single corn-drill was not to be seen; and the same may be said of chaff and turnip cutters. The routine of management so successfully but formally practised for the previous half century did not include machinery of this kind, with the solitary exception of turnip-seed sowing machines; and in only a few cases does so at the present time. Each farm had its force of resident farm labourers. The cattleman who fed stock also pulled their turnips and "bundled" their straw, but had not time to cut either; nor was there another to do so, on the farm. The operations of drilling and hoeing corn were similarly situated. On the introduction of guano, the farmer himself and his foreman had just so much extra work to perform. Such were the circumstances at issue.

With regard to sowing either corn or guano, and similar manures, broadcast by the hand, there cannot be a doubt but the practice is out of date. Whatever obstacles may stand in the way of using machinery, for example, they are far from being so great as the objections to this antiquated and enslaving practice of seeding and manuring. The soil and climate may be greatly improved by drainage and proper systems of culture; and also many tenacious clays rendered sufficiently friable for drilling in wheat during autumn, winter, and spring. Improvements of this kind will afford the farmer not only a better seed time, but a longer period to commit his seed to the ground; while it will procure him an earlier harvest and better quality of straw, with turnips fit for storing before the setting in of severe frosts, so as to admit of straw and turnip cutters being used: thus effecting a greater economy of food. There will thus be not only an economy of seed, but of its produce, while the toilsome drudgery of seeding and manuring will be greatly alleviated. Between Berwick and Aberdeen we observed a few broadcast-sowing machines in operation—some sowing corn, and others grass seeds; but not a single drill, either sowing corn, guano, or seeds. So far as grass seeds are concerned, the former practice is good; but the economy of seed, in the case of corn, is scarcely better than when sown with the hand, if so good, from its falling into the footprints of the horses. No doubt, with narrow ridges, the horse may travel in the furrow, the machine sowing the half-ridge on each side; but although this obviates the objection to footprints, it still leaves the prodigal waste of seed unremoved, while vegetation is less favourable for an abundant and early harvest.

The obstacle of hilly land, again, although insurmountable in a few cases, yet, upon the whole, falls to the ground, the vast majority of fields being easily drilled. England, although not a mountainous country like Scotland, is yet far from a level one; and the little hills of the former often rise more abruptly than the more elevated of the latter, presenting a greater barrier to the use of sowing machines; consequently the farmers of the north have nothing to fear from this source. Where the seasons of seed-time and harvest are precarious, an extra strength of teams will always be required; and although getting in seed with drills and horse-hoeing may increase the demand upon the stable, we have always found the number of horses required in harvest in this country sufficient for the labours of seed time, when drills and horse-hoes are used. On farms where there is no winter corn, spring sowing would no doubt be always a busy season; but if labour is properly organized, there will be no difficulty in getting in the seed with drills and dibbles in proper time.

The last obstacle—an over-attachment to the formal rules of the old school, or the false impression of a perfect system—has generally been experienced a dangerous one, almost impossible to surmount. Of the ninety-and-nine questions which arise on the threshold of the subject, we dare not make mention. The illustration of two intelligent and successful practical farmers bringing implements and machinery from the north, is all we can glance at; and even here we have unfortunately to pull the beam out of our own eye before we propose to take the mote out of theirs. The facts of the case are briefly these:—

Although our improved implements and machinery have hitherto been superior to those of the North, they are, unfortunately, yet the exception on the vast majority of farms. A very superficial glance at our provinces, especially of farms to let, cannot fail to convince the most sceptical that the statistics of their mechanics would prove this. Twenty years ago Scotland, generally speaking, was ahead of England; and although the latter is fast gaining that position which she ought to occupy, yet, putting good and bad together, the general question of superiority is one which we shall not take upon us to decide. In the North there is certainly less of that *lumbersome rubbish* of implements so common, for instance, even in our metropolitan counties. Yearly tenancy has its influence as well as stereotyped leases of longer duration; and that influence in the absence of *tenant-right* cannot be said to have been in favour of mechanical progress, but the contrary; inducing many an intelligent and industrious farmer to repair, for another year, old things which otherwise would have been superseded by new of the most improved construction. On the contrary, although long leases have a tendency to formality during their currency, yet at their renewal a greater demand is experienced for improved implements and machinery than under yearly tenancy; consequently, the progress made will depend upon the information of the tenant. If this is limited to the district in which he resides, as is yet too frequently the case, and if he removes from that district to another, no matter where it may be—whether north, south, east, or west, home or foreign—and finds mechanics in a less forward state, there is but one commendable course for him to steer, viz., to take the most improved machinery of his native county with him: on this practical men cannot be divided.

There is, however, another question involved—one equally practical, but not so easily decided—viz., the propriety of bringing implements and machinery from the North to this country at present. We are not here saying that Scotch farmers and implement-makers should be behind those of this country in the march of progress; much less, that they are so—or will remain so, if they are: practical questions of this kind we leave for Carlisle to decide; but until her decision is given, our northern readers, we hope, will not forget the result of the Great Exhibition of 1851, and every year since so much in favour of England. But while we draw attention to this fact, we must not overlook another: the impetus which 1851 has given to progress in the North, and the rapidity with which improvements of every kind are there being embraced. Our implement-makers must not fall asleep at their post, and dream of prejudice among their northern rivals or customers, where profit and loss or self-interest is involved, or they may find their best manufactures improved upon by simplification without reducing their effective powers, but the contrary, and sold at a less figure; for it is generally shrewdly remarked that "the price of improved machinery in England leaves a margin sufficiently broad to work upon." The opening up of our northern provinces by railroads, and the erection of machinery there of the most improved kind, for the manufacture of machinery, is fast removing those advantages which our southern ones have hitherto enjoyed—placing both upon a footing of equality in this respect, if it does not put the latest erected in the most favourable position. At the same time, farmers in removing from Scotland to this country, especially from the northern provinces of the former to the southern provinces of the latter, or from one district to another when distantly situated, would do well to judge for themselves; and in doing so, not to be guided by the implements and machinery which they find on farms in the market to let, or old-fashioned village shops in the neighbourhood; but to go at once to the fountain head—the implement-makers on the prize lists of the Royal Agricultural Society; or, what is still better, attend one of our summer meetings, where they will have an opportunity of seeing things tested by experiment before they commence to stock their farms with them. Let those of them, for instance, who intend entering farms in October or subsequently, visit the ensuing meeting at Carlisle.

GRAIN THRASHING.

A numerous meeting of the members of the Sprotbro' Farmers' Club assembled at the usual place on the evening of Wednesday, when the Rev. J. G. Fardell introduced the subject for discussion, viz., "The best and most advantageous method of thrashing out grain crops." He said it would not be expected that he could practically say much on the subject; but living amongst them as he did, he could not but observe what was passing around, and he saw and heard repeatedly the steam-engine in full operation in the process of thrashing. There were three modes of thrashing—the flail, horse-power, and steam-power: it was for the meeting to say which of these was the best and most advantageous, and if he might give an opinion, he should say that steam would have the preference.

Mr. Brooke, of Hampole, was of opinion that on a small farm it would be most convenient to use the flail, but on a large one he should consider steam-power as most advantageous in saving horse and manual labour, which might be otherwise employed on the farm at the same time. A fixed machine, too, he should prefer, as it could be worked in any weather, and an opportunity could be taken to get a stack in on a fine day. They could then thrash under cover at their own convenience, without any loss in chaff, riddlings, or straw, as all were kept dry, and therefore would not be deteriorated by unfavourable weather. They often saw stackyards in a very littered state when a portable machine had been in use. His machine, which was a fixed one, he believed consumed more coal than a portable one, viz., half a ton per day. With four men and four women he could thrash 80 loads of wheat per day, and by means of elevators the corn was conveyed into the winnowing machine, and the straw also moved from the shakers by a sack-carrier, which conveyed it into the bay end, and only required one man to remove and tread it down. This invention of a sack-carrier was of recent date, and invented by Thackray, of Doncaster. His machine answered his purpose very well, but no doubt since it was erected, numerous important improvements had been made in them, and a much greater amount of corn could be thrashed in the same time.

Mr. Clark, of Cusworth, was of opinion that for thatch drawing the flail was as cheap and advantageous as steam-power. A 50 or 100 acre occupied could not do with steam, as by its use he would thrash out more than was desirable at one time.

Mr. Wood, of Sprotbro', and Mr. Richard Hickson, advocated the using of horse-power machines fixed on the premises where the farms were under 300 acres, taking into consideration the saving of time and expense in probably having to go a considerable distance to fetch a portable machine each time one was required.

Several other members advocated the old system of thrashing with the flail, provided they could obtain hands, preferring it to any other plan, contending that the straw was fresher and sweeter on that principle, while the cattle improved more than with machine straw. Considerable discussion ensued on the merits of some portable steam-machines now in use in the neighbourhood, particularly one belonging to Mr. Richard Turton, of Barmbro', and manufactured at Grantham by Messrs. Hornsby and Son, capable of thrashing 20 loads of good shorn wheat in one hour, and dressing it once over. The meeting ultimately came to the following resolution:—"That upon a farm of upwards of 300 acres it is advisable to have a fixed steam thrashing-machine with all the recent improvements; upon farms of less size a fixed horse-machine, with the occasional aid of a portable steamer, as the best and most advantageous method of thrashing out grain crops."—Doncaster Gazette.

ON THE CONFORMATION OF THE CHEST IN HORSES AND CATTLE.

At the late monthly meeting of the Highland and Agricultural Society, held in the Museum, David Low, Esq., late Professor of Agriculture, in the chair. The Chairman introduced Mr. Barlow, of the Veterinary College, who read the following paper.

I presume that all here are more or less familiar with that knowledge which enables us to infer the qualities and capabilities of horses, by observing their action and external form. Some of you are deservedly esteemed "good judges" in these matters; you can select a hunter almost without seeing him leap, can foretell the winner of a race by observing his "points," or choose a hack without riding him. Whence came this knowledge? Who taught it you? Without wishing to imply that any knowledge is intuitive, I may remind you that certain acquirements, in which some persons specially excel, are the very things in which they learn least from others, and most from themselves. I pretend not to explain this fact in any other way than by assuming that each of us has some predominating taste and bias, which, if gratified, cultivated, and engrafted on sufficient mental capability, will conduct us to excellence in that particular direction. So it seems at least in regard to horses; all men can see them, but all men cannot view them aright; some men never acquire "the art of seeing" them, other men never see them but to learn.

Now, although this *judgment* in horses does not always depend upon a person being minutely acquainted with matters of anatomical and physiological detail, yet I contend that physiological knowledge (in a rudimentary state, certainly) unconciously lies very near the source of those opinions which are formed by good judges. The man who truly says that a horse possesses "good loins," expresses in general terms the anatomical and physiological fact that flesh and bone in the loins are well developed and well formed. The person who correctly states that any given horse has "good hocks," implies that the structure of these joints are well adjusted as to size, outline, and solidity. He may know little of those endless technicalities and anatomical details which attach to the hocks, loins, or other parts; but he is practically aware that flesh, bone, and sinew are required to build and move the animal fabric; he knows by external proportions, outlines, or other indications of form, and by what is expressively called *action*, when flesh, bone, and sinew are best devoloped for enduring wear and tear—therefore he judges accordingly.

The scientific and the merely practical man, however, may profitably combine their knowledge; and I wish to lay before you to-day, in the simplest manner possible, certain anatomical and physiological facts regarding the chest in horses and cattle, in order to amplify as well as explain many correct ideas you have already acquired from an extended acquaintance with the outward forms of our domestic animals. This subject has been selected because on two former occasions I had the honour to make some observations on diseases affecting this part of the body, so that the way was thus prepared for what will follow to-day.

The chest, as every one knows, is the great cavity containing and protecting those essential organs of circulation and respiration—the heart and lungs. It is also much more concerned in ensuring speed, good action, and endurance, than is sometimes remembered. In illustration of this last statement, let me remind you that a spacious and well-formed, in other words, a *good chest*, is always associated with a strongly-developed muscular system; again, a small and badly-formed chest always involves deficiency of muscle, and often deficiency of bone also. This is true in men, horses, oxen, and dogs alike. In a man whose breast is narrow, the shoulders droop forward, and are rounded instead of square; he is often round in the back also; he has slender arms, thighs, and legs, and a weak body; he may be tall enough, and too tall, but is certain to want breadth, muscular power, and strength of bone in good proportion. So a horse with flat short ribs, and of course a contracted chest, has the fore-legs standing near together, is slender in limb, and defective in those masses of muscle which are required to combine great strength with easy, rapid, and lasting powers of locomotion. A flat-sided, narrow-chested cow, is usually wanting in most points which render cows truly valuable. The same remarks apply to other animals. On the other hand, a good-chested horse is the one for active endurance, and good-chested cattle are most to be prized for milking, feeding, or labour; a man, too, having his shoulders well apart, and showing a good front, is best adapted for great physical exertion, and possesses best health; truly athletic men, as every one knows, are not narrow-breasted, but broad-chested.

Extending from the base of the neck before, to the commencement of the loins and abdomen behind, the horses' chest occupies a large proportion of space. A chain of eighteen irregularly-shaped bones (*dorsal vertebræ*) extends along its roof from end to end. The back bones are surmounted by strong elevated projections (*spinous processes*), the upper ends of which determine the height of the withers and line of the back. The dorsal vertebræ are so firmly united by means of various ligaments, that dislocation (except caused by fracture) is impossible. As individual bones, they possess a very small amount of motion; but the spine, as a whole, is endowed with considerable flexibility. The ribs are eighteen in number on each side, they enter into the roof, sides, and floor of the chest. These strong bony arches spring from the dorsal vertebræ, to which they are attached by means of joints: they extend outward, backward, and downward. Eight of the front ribs (called *true ribs*) on each side are attached to the breast bone by means of cartilaginous prolongations, which by passing downward, inward, and forward, always take a direction different from the bone of the rib. The remainder not being joined to the breast-bone are called *false ribs;* at their lower ends they also possess cartilaginous appendages, which are folded one under another. These false ribs give attachment to the diaphragm. The true ribs aid powerfully in supporting the body, through means of their muscular and tendinous attachments to the shoulder-blade and breast-bone; they require, therefore, to be firmly fixed, and possess comparatively a small range of motion, for extensive mobility in them would involve a degree of looseness quite incompatible with the requisite strength. The false ribs are not specially concerned in supporting weight, and are therefore most moveable; in order also to facilitate their motions, they are smoother, more slender in substance, and more widely arched than the true ribs. The breast-bone (*sternum*) is deep, but remarkably short and narrow as compared with that of the ox, and bears much resemblance to the keel of a ship. The diaphragm or midriff is a muscular tendinous web, extended across the body internally; it passes from the lower ends of the false ribs on one side, to corresponding points on the side opposite, and forms a division between the chest and abdomen. So far as the preservation of life is concerned, this muscle may be esteemed as next to the heart in point of importance—it is the great agent in respiration. The horse's diaphragm is peculiar for great obliquity, or inclination of its upper part backward.

The respiratory or breathing processes are ever going on, from the moment of birth to the moment of death; they cannot be arrested without life being destroyed or endangered, Respiration consists of two actions, these are—*inspiration*, or taking air into the lungs, and *expiration*, or passing air outward from the lungs. During active inspiration, the ribs are elevated and drawn forward; their arches thus extend further outward, and the chest is widened from side to side. At the same time the diaphragm recedes towards the abdominal cavity, the intestines are pressed into the expanding flanks, and the chest is increased in length as well as in breadth. Whilst this enlargement of size is being secured, the lungs become filled with air, and occupy the increased space provided for them. When fresh air is thus admitted into the lungs, and that previously contained there has become charged with impurities given off from the blood, the act of respiration is performed. During this process, the ribs recede to the point from which inspiration raised them, the diaphragm bulges toward the chest, the flanks and abdomen fall inward, and the lungs become reduced in external size, as well as internal capacity. When a horse is standing quietly at ease, the respirations are from ten to twelve in a minute; the ribs are scarcely perceptibly raised, but the diaphragm and abdominal muscles are in continual easy action. Hence, in quiet breathing, rising and falling of the flanks and lower abdominal wall are about the only motions we observe. Under active exertion, however, such slight movements are inadequate to ensure sufficient expansion and contraction of the chest. The ribs, therefore, are raised by muscles acting specially upon them, and the number of respirations is increased.

Now it is a well-known fact, because attested by daily experience, that when a man or animal becomes distressed for breath, he is unable to undergo any prolonged laborious exertion. On the other hand, when bodily labour is performed by means of comparatively easy and slow breathing, such labour can be continued far longer and far more efficiently than when respiration is highly excited or oppressed. We can, indeed, predict a horse's capacity for enduring throughout a long and laborious day, by watching his breathing under the first half-hour's exertion. If he should blow, purge, perspire much, and become flat in the sides, he is not trustworthy; but if he should keep round in the flanks, and breathe freely, without perspiring unduly, he is worth dependence so far as endurance is concerned. Some horses can go at a satisfactory speed without betraying unusual distress during a long day's work in the fields or in harness, and appear as lively at night as they were in the morning. They feed well on coming into the stable, and will be little the worse to-morrow for what they have done to-day. Other horses go freely for an hour or two, but lose energy, and accomplish their work under symptoms of increasing fatigue. They refuse to feed on coming home, and for days after this are unfit for any active exertion. It is too easy to work some horses beyond their appetite; other horses again perform any amount of labour, yet feed heartily, and seldom appear tired.

Let us endeavour to explain what the chest and its contents have to do with this ability for endurance in one case, and inability for endurance in the other. Active exertion induces a great amount of wear and tear in the system, for every motion necessitates more or less destruction of muscular tissue. If the muscles, then, are not continually supplied with adequate nutrition, or if their exhausted and worn-out products are not restored by new substances, they become incapable of action. Their supply of actual nutrition comes through arterial blood from the food; blood, enriched by good food, must therefore be supplied in proportion to the demand established by exertion. Venous blood, however, is continually taking away exhausted tissue, and carries it to the lungs, whence it is expired. If the lungs, chest, and heart are capacious and efficient in action, the supply of good blood is sufficient to maintain the physical powers in full integrity. Large lungs, a powerful heart, and a good chest, make and circulate abundance of good blood; or rather, good food makes rich blood, good respiratory powers keep the blood pure, and a strong heart keeps the stream in active motion. In a horse where such a state of things exists, there is a power of digestion which work can rarely impair, and a muscular development which exertion can only improve. If, again, the lungs and chest are small in size and ineffective in action, the blood becomes highly charged with noxious matter; this, like a poison, destroys the appetite, and muscular power will certainly fail when muscular nutrition is not maintained.

In the human being, fitted as he is to maintain an erect posture upon the two lower extremities, the arms are attached to the chest by means of bone as well as by ligaments and muscle. The chest is flattened before and behind, but rounded laterally; it is therefore much wider from side to side than from the breast to the back-bones. The arms are attached to its upper and outer corners, the shoulder-joints are kept apart by bones (clavicles) acting upon them, and the shoulder-blades lie almost behind. This position gives the arms a wide range of motion in every direction, and, including the hand, although capable of performing a greater variety of actions than any other single organ, yet they are not adapted for supporting the body.

The capacity of a horse's chest depends of course upon its *breadth*, *depth*, and *length*. *Breadth* of chest is due to the amount of divergence, or arching outward and backward, of the ribs from the spine. *Depth* of chest is determined by the length or prolongation of the ribs in a direction downward. The anterior (fore) limbs are required to aid in supporting the body in a horizontal position, and also serve as important organs of progression; they become, in fact, reduced to pillars of support and levers of propulsion only. Hence, so far as their osseous framework is concerned, we find them resolved into comparatively simple columns of bone, composed chiefly of long pieces piled one upon another, united by strong ligaments, sinews, and muscles, and tipped or protected below by a tough thick horny box or hoof. Their motions are chiefly those of bending in two directions, forward and backward; the shoulder does certainly possess considerable rotatory movement, but the joints below it act like ordinary door-hinges. Now to bring these limbs sufficiently beneath or within the weight they have to sustain, each side of the chest is much flattened before. This flattened surface is most complete over the four or five ribs first in order, and is covered by muscle, tendon, and elastic tissue, which join the shoulder-bones to the chest. There is none of that bony union found in man, because such a mode of connection would create dangerous concussion at every step. The flattening of which we have spoken is always more or less marked where perfect no collar-bone (clavicle) is present; hence, it is seen in all quadrupeds, and, as a general rule, is greatest in animals which are specially fitted for rapid action. It is more obvious in the greyhound than in the bulldog or mastiff; is more perceptible in the wild goat, chamois, and deer, than in the well-bred shorthorn cow or Leicester sheep; it is more evident in the wild boar than in the prize swine of our cattle-shows; and as everyone knows, it is far more determined in the racer than in the dray-horse. A very broad chest between the shoulders and elbows —one that throws the forelegs widely apart, is incompatible with great powers of speed. Horses for instance, such as those gigantic creatures seen in London drays, make a poor business of a trot, and a mere burlesque of galloping; no more can a bulldog walk or trot like a greyhound.

In trotting, one fore-foot is on the ground at once; whilst each foot descends and becomes placed, it approaches the middle vertical longitudinal plane of the body; it is brought, in fact, below the centre of gravity, in order to balance the weight above; and the corresponding shoulder is thrown outward. This bringing of the feet inward, so as to place them more directly underneath the superincumbent weight, with the accompanying outward or balancing shoulder motion, occupies a portion of time, and occasions a rolling or swinging gait, which is more perceptible in the fore than in the hind limbs. The same rolling action is also seen in walking. A wide-chested horse trots much like a bulldog, and for the same reason, viz., a new centre of gravity has to be found for every step, a new balance for every stride, and side motion attends the motion in a forward direction. In galloping, the two fore-feet are together on the ground at *one* moment, and the two hind-feet at *another;* in this action the fore-feet do not require to be brought so much inward, because, being placed one on each side, they sustain the weight without. Owing, however, to the distance at which they stand apart, the action is wide, loose and jarring. We assume, then, from what is seen in animals adapted for most rapid action, that this flattening inside the shoulder-blades, and corresponding approximation of the fore-legs, are necessary conditions of form. It is, however, quite apparent that such flattening will greatly reduce the chest in size, and thus lessen the lungs within. A remedy, however, is ready for such a seeming evil. It is this: the chest of a well-formed horse is increased in depth, in order to compensate for apparent want of width. When the chest is thus narrowed from side to side before, the fore-legs approach in like proportion. If near enough, and not too near, they perform straight or direct motion only. After being raised from the ground, as in walking or trotting, and during their descent in the act of stepping, they need not describe any rotation inward in order to be brought underneath the centre of gravity, for they are already sufficiently below the superincumbent weight, nor do the shoulders and chest require to be thrown outward; the step is consequently smooth, the body is never off its balance, and all rolling action is thus avoided. In the gallop, too, where the chest is narrow, there is neither loss of time nor useless expenditure of muscular power connected with width and looseness of action, but the limbs play evenly in parallel planes or lines of direct onward motion, and, so far as speed is concerned, great advantage is gained.

A *too narrow* chest, however, is about the greatest of evils; it is sometimes so unduly contracted, and involves other defects so slightly counterbalanced by any advantages, as to render many horses of light and even of heavy breeds completely worthless. How many horses accounted well-bred, after proving useless for other purposes, find their way, while yet young, into our street coaches! We see the poor creatures, with broken tottering knees, bruised inside the shank and fetlock, occupying all city cab-stands, and hanging their heads to the ground, as if broken-hearted. When a very narrow chest is also very shallow in depth from above to below, the fore-legs come too closely in contact, or, as a popular saying expresses the appearance, "they seem to grow out of one hole." There is often another serious defect in a narrow-chested horse; owing to the ribs not descending sufficiently low between the elbows, and a deficiency of muscle over the breast-bone, the elbows turn inward, and sometimes actually stand under the breast. This causes the toes to turn outward; every time a fore-limb is lifted from the ground, the foot and shank bend inward, but the knee outward; and as the foot approaches the ground again, it is very apt to strike the opposite fetlock. By standing some distance before a horse with this kind of action, so as to watch his gait when walked or trotted towards us, the fore-legs and feet seem actually plaited or folded over one another at every step. In a rapid trot this involved action becomes confused, the animal is continually apt to strike the foot of one leg against the foot, fetlock, or shank of the leg opposite, and may come down at any moment. More or less turning out of the toes is often seen in race-horses, especially among second-class animals; when the turning out is not very marked, and the fore-legs are not too close, it is usually accounted no great defect, where speed is the only object, and where little weight has to be carried. On the other hand, where the fore-legs are almost close together, and the toes are widely everted, we may be sure that the chest is narrow and shallow to an injurious degree. In making these observations, I must remind you that many cases of everted toes and interfering limbs depend upon malformation of the fore-legs, and not upon any defective formation of the chest. One other imperfection attendant upon this formation may be noticed. A shallow-chested horse often carries a saddle badly, and the girths are continually slipping forward close within the elbows, because the chest tapers off so much in this direction. If the withers be low also, there is nothing to prevent the saddle from coming over the shoulder-blade; such a horse is useless for riding. It is impossible to give any standard of measurement which should determine the width or depth of chest in this region. The famous *Eclipse* had a space of only 7 inches between the arms, yet he possessed great depth of chest, while his endurance and speed are matters of history. We assume, then, from what has been said, that in horses where speed is the one essential thing, and where the lightest weights are carried, as in race-horses especially, the chest must be flattened between the shoulders, and the fore-legs must be approximated more closely than in any other horses. This flattening, however, must be compensated for, or accompanied by a corresponding increase in depth (a depth that is rarely too great), otherwise the brisket is imperfectly covered with muscle, the toes turn out widely, the heels turn inward, the feet interfere with the legs during rapid action, the powers of endurance are slight, the limbs soon give way from bruises or strains, and, in fact, a complication of such grave defects will soon concur, as to render such a horse a living eye-sore when at rest, and a dangerous nuisance to ride or drive.

The chest attains, or ought to attain, its *greatest width* before, in animals required for heavy slow draught, such as dray, waggon, and cart-horses in general. It is not any recommendation for these horses to be able to gallop or trot swiftly; their good qualities consist in being moderately active, but patient and enduring at work, and able to move or bear heavy weights. Here the chest can hardly be too broad before, or can scarcely be too deep either; for width and depth are needed, in order to give spacious attachment to those enormous muscular masses upon which the collar rests, and against which the force of draught immediately falls. Whenever we find great depth and width of breast in a draught-horse, we are almost certain to find great general muscular development also. A tall, shallow, and narrow-breasted draught-horse is usually flat-sided, lean, but long in the leg; he often turns out his toes in a most unsightly way, and is wanting in powers of patient effective endurance. We not unfrequently find that horses with broad deep chests are apt to turn their toes inward; that is, just the reverse of what is seen where the chest is narrow and shallow. This arises from the circumstance that width of chest descends so far between the eldows as to throw them outward, and of course directs the toes inward. We often observe, too, that these horses wear the outside more than the inside web of the shoe, in consequence of the foot being brought greatly inward at every step. These peculiarities, however, unless carried to an extreme, will rarely involve any material disadvantage; knowing, indeed, the causes on which they depend, we are often glad to tolerate them. Without pleading in favour of either deformity, we would prefer a broad deep-chested horse, with toes turned inward, to a narrow shallow-chested animal with his legs nearly close together, and toes turned outward. In all cases, then, where rapidity of speed must give place to prolonged exercise of great muscular power, and a slow pace, where every inch of space upon which the collar rests gives increasing advantage, where great weight requires to be thrown into the collar by the animal machine, in order to overcome and counteract an opposing weight behind—as in all purely draught-horses—the chest in front can scarcely be too deep or too wide.

That part of the chest behind the shoulders, and extending to the last or short rib, is commonly called "the side." The bony framework of this region is mainly composed of the false ribs, which as a whole, are considerably more arched than the true ribs. Their length decreases, but their projection outwards gradually increases as we count backward. In proportion as these bones are sufficiently arched, the animal becomes flat-sided; while long ribs well arched, and inclining strongly backward, give rotundity of side, or "roundness of barrel," and confer that desirable formation known by the term of being "well ribbed up." Well-arched long ribs enclose a wider space or span than ribs which are short and flat; they also move more freely during respiration, and are therefore most desirable. A horse with round deep sides has almost always large masses of muscle on each side the back-bones, and becomes gradually wider from the withers to the haunch, without showing any very marked depression in the flanks. Attendant upon this formation, we generally find the abdomen (belly) properly united to the chest; it is neither unduly tucked up nor pendulous to an unsightly degree. In fact, there is abundance of room to contain the digestive organs in their right place, because depth and width of chest secure corresponding proportions in the front part of the abdomen. In such animals we usually find that digestion is well performed; if sufficient food be allowed they always look well, their condition is good under any amount of labour. This formation of chest is a good point in all horses, and becomes especially requisite where prolonged endurance is required for fast or slow work. We must, however, confess that many hunters and racers, of proved powers of speed and endurance, are not particularly round in the side. In these cases, although the chest is also sometimes much flattened between the fore-legs, it is often very long, and remarkably deep in every region; we have thus a conformation favourable to speed, and not always prejudicial to endurance. Horses of this conformation often bring the hind-legs well forward in galloping; there is not any rolling motion, but the action is smooth and all onward. A light short man often prefers this kind of horse, because his thighs lie well, and grasp the animal's sides; he feels secure in his seat, and can employ his legs and heels to full advantage. It is truly astonishing to remark the pace and ease with which these horses will carry a light man with good hands and heels.

When a horse has flat shallow sides, he is always hollow in the flank, or imperfectly ribbed up, because the ribs are too short, or too flat, to include the space in front of the hanch-bone. Such an animal is usually "pot-bellied," also because the abdominal viscera project almost entirely downward, in consequence of defective capacity elsewhere; he is often long and weak in limb, and is certain to want general muscular development, Such a horse never looks well; for, owing to want of volume, the heart and lungs are inadequate to ensure that abundant circulation of pure blood which is needed to maintain flesh, bone, and sinew in a state of full integrity. A creature of this kind becomes speedily distressed under exertion, which a deep, round-chested horse would easily endure for hours successively; his bowels roll loosely about on the relaxed lower surface of his pendulous abdomen, instead of being well packed and sustained in contact with the spine, and large concave diaphragm also. This undue motion of the intestines causes them to evacuate their imperfectly digested contents too soon, and the horse not only blows, but purges also. Endurance here is out of the question.

Length of Chest.—Eighteen dorsal vertebræ and their intervening ligamentous pads stretch along the roof of the chest in a continuous nearly straight line, and determine its length, which is proportionally greater in horses than in most other animals. The floor is remarkably short, as will be seen by the bony part of the sternum which forms its limit. The diaphragm is inserted into the posterior ends of the sternum below, and, following the lower end of the false ribs, it inclines backward to reach the last dorsal vertebra above. This shortness of chest below, and in that part too where it is narrowest from side to side, reduces the volume of the lungs in this region. But, on the other hand, the inclination of the diaphragm backward, and a great extent of dorsal region, add length to the lungs where they are already widest, in consequence of the arching ribs. The horse's chest, indeed, is remarkable for capacity above. Now, it must be observed that there is wonderful significance in this. The chest is longest where the ribs have greatest range of motion, and where such motion will not interfere with progression. In other words, the chest is most capacious (it is longest and widest) in those dimensions where the moveable framework composing its walls can most efficiently increase and diminish its size during active breathing. Again, the chest is smallest (it is narrowest and shortest) where its outer framework becomes connected with the fore-legs, and possesses least mobility. There is still another view of this interesting matter; the chest is increased in length above, at the expense of the abdomen, in order to afford so much the more space for those regions of lung which are most active in respiration; but the abdomen is increased below at the expense of the chest, because this region contains lung of least respiratory capacity. It is also worthy of remark, that in horses formed especially for speed, the chest is proportionally more extended along its roof, and the diaphragm is more oblique, than in horses with heavy carcases, and adapted for slow draught only. This line of back-bones, however, forming as it does a sort of jointed beam or suspension bridge, becomes weakened if it be too long from end to end. Hence, where vast solidity, or great weight-bearing powers are needed, as in the cart-horse, a short back and round deep carcase are desirable. On the other hand, where great flexibility is required, in order that the race-horse, for instance, may bring his hind-legs far forward to secure great length of stride and propulsive power, the back must be longer. In most animals specially adapted for mere speed, the back is moderately long, and the legs (especially the hind-legs) also; these conformations are well shown in the hare and greyhound. In leaping animals, again, the back is somewhat shorter; so in a hunter intended to carry a heavy man, the back should be shorter than in a race-horse, in order to secure the needful strength. A harness horse may have a longer back than a hunter, because, if combined with good well-placed limbs, and a deep chest, it gives him freedom and length of step.

The upper external undulating "line of the back" is formed by the ends of certain appendages (dorsal spines) attached to the back-bones. The first twelve or thirteen of these incline slightly backward; the remaining six stand nearly upright. Their length gradually increases from the first to the fifth; and the third to the sixth, inclusive, are so decidedly longer than the others, that they form a very prominent eminence, which rises between and above the shoulder-blades. This elevation is called "the withers." The summits of the bones of the withers give extensive attachment to a powerful elastic double ligament, which suspends the head and neck. Each side of the withers affords insertion to muscles employed in raising the fore parts of the body upon the hind, or the hind upon the fore; they are specially concerned, too, in giving origin to muscles which raise and turn the head and neck. When the withers are low, they consequently afford so much the less space for these importan fleshy masses. In the horse, the withers rise more abruptly above the general plane of the back than in most other animals, and well-raised withers with a properly-carried head and neck often go together. Well-raised withers, then, constitute a "good point"; this point, however, may be more essential in some horses than in others. It is quite possible, for instance, that a racer with low withers may possess great speed, and neither hares nor greyhounds possess high withers. The famous Eclipse is said to have been lower in this part than at the rump. A racer at full speed holds his head *extended* and *low;* he does not require to raise the fore part of his body greatly from the ground; but it is requisite that he should cover, or be propelled over, a great space at every stride. This propelling power resides most in the hind parts, so that if muscular development be good in the loins, quarters, and thighs, mere lowness of withers is no great disadvantage in race-horses. In a hunter, again, the head ought to be carried higher, so that the fore-legs may be freely raised, and in order that he may see or "measure his leap," as the phrase runs. A horse carrying his head low, and having low withers, must step low, because the muscles raising and advancing the fore-leg act at a disadvantage. One great point in securing a good upward leap over a fence, consists in raising or holding the head and neck well up; this is accomplished by muscles acting from the dorsal spines upon the neck and head; coincident with this action, the fore-legs are raised by muscles acting upon them from above, and the fore part of the body is elevated about the same time by muscles operating on the withers from behind. The withers, then, are levers as well as points of purchase, and in proportion to their length, such is the power of muscles acting from and upon them. Again, when the withers are well raised and prolonged backward, the neck usually rises well from the chest, increased depth and obliquity are given to the shoulder, the fore-legs stand well forward in advance of the centre of gravity, and greater security of action is thereby conferred. If a deep chest is added to this conformation, the saddle will lie in the right place, and remain there almost without girths; but no girthing in the world will secure a saddle where the withers are low, and the breast shallow before.

In horses used for the saddle, and possessing a desirable conformation of this part, a perpendicular line descending from the highest point of the withers to the ground, will fall several inches behind the elbow point, thus showing that the fore-legs are well advanced. In horses used for draught, this line will often fall along the outside centre of the limb, or even still further forward; this indicates an upright shoulder, which in heavy horses may co-exist with high withers. Such a formation is advantageous where great weight requires to be thrown into the collar; it shows that the fore-legs are placed backward and near the centre of gravity. Where the fore-legs stand too far under the body, we can often see the point of the breast-bone projecting forward, or advancing before the retreating shoulder. Although, however, such formation may be advantageous for heavy draught-horses, and may be tolerated, or even preferred, in coach and omnibus horses, where powers of draught are almost as important as powers of speed, yet a light harness horse, carriage horse, and hunter, should have retreating high withers; the line of which we have spoken should fall far behind the fore-leg, the point of the breast should be concealed by advanced shoulder points, in order to ensure the speed, freedom, elevation of action, and forward-reaching movement of limb, which are so essential to the practical value of these horses.

Behind the withers, the back is mostly slightly depressed, so that the middle of this region may sometimes be an inch or two lower than the rump. In a well-formed back, however, the line from the posterior base of the withers to the rump should be almost straight. A slight depression involves no perceptible weakness, and affords a convenient place for the saddle to rest upon. A great or palpable hollow, however, constituting what is called a "saddle back," shows that the vertebral bodies are bent greatly downward, and form a weaker line than a tight well-traced chain or suspension bridge. Accompanying this form, too, we usually find a deficiency of muscle on the back and loins, and the sides, although possibly round, are but shallow. In some horses, again, the dorsal vertebræ form a line which is concave below and convex above, so that their spines project too far upward, and render the back round or "roached," like that of a fish. Such backs are often very strong, because of being arched; still they are highly unpleasant to ride upon, and are most unsightly under harness. In heavy draught-horses, and in large carriage horses, the line from behind the withers to the rump can hardly be too straight, for such a back is strongest in bone and flesh; if the ribs joining such a back are long and well arched, we usually have muscular loins, and a chest conveying the very expression of great strength and endurance combined. In saddle horses (hunters, perhaps, especially) a slight hollow behind well-raised withers is often preferred by some, for it gives the rider an easier and more secure seat, and does not sensibly impair the strength of this region, if the ribs are well arched. A hollow-backed, flat-sided horse is almost useless; he seldom looks well, rarely goes well behind, and is totally unadapted for holding against heavy loads when going down hill.

The situation of the *centre of gravity*, or balancing point in a horse, is a matter of much importance. All of us know that horses with low, straight, thick shoulders, and clumsy, depressed heads, have unsafe and heavy action when used for saddle or light harness purposes. We know, too, that all moving or stationary structures become unsafe in proportion as the centre of gravity departs from the centre of its supporting base; and, if the centre of gravity should fall beyond this base, an edifice cannot stand. The horse's body is supported on a base formed by four feet; if each foot sustained an equal proportion of weight, the line of gravity would fall at a point equidistant from them all. As, however, the head and neck overhang the two anterior limbs, and as the trunk behind is partially occupied by the lungs, and comparatively light in weight, the two front legs support more weight than the two behind. In illustration of this fact, we relate an experiment originally detailed in the *Journal de Haras*, *Juin*, 1835, and cited by Mr. Percivall, from whose work on "Form and action of the horse," the following extract is taken:—"Messieurs Morris and Baucher, desirous of ascertaining correctly the influence of the head and neck on the distribution of the weight of the horse on his four legs, especially on the fore and hind-legs, as pairs, had horses weighed in scales, constructed some years ago at the custom house, for that special purpose. The first placed upon the balance was a hackney mare, with saddle and bridle on, well enough shaped, except that she was rather heavy before. She was found to weigh in her fore hand 210 kilogrammes,* in her hind 174, total 384, difference in favour of the fore-hand 36; there being during the weighing a fluctuation between three and five kilogrammes, arising from the respiratory and visceral movements. The head was now forced down until the muzzle came to a level with the chest. This made a difference of 8 kilogrammes additional on the fore-hand. Elevation of the head until the muzzle rose as high as the withers, caused a transfer of 10 kilogrammes from the fore to the hind-quarters. From these results we may deduce the conclusion, that the more the head is elevated, either naturally or by the hand, the more its weight, and that of the neck, is equally distributed upon the limbs, without anything forced in the position. After these experiments, M. Baucher mounted the mare. The weights then stood—fore-hand 251 kilogrammes, hind 197, total 448, difference 54. The horseman being placed in an academical position, had his weight, which was 64 kil., distributed thus—41 kil. upon the fore-hand, and 23 upon the hind. Throwing the body backward occasioned a transfer of 10 kil. from fore to hindward; then gathering up his reins, he caused a further addition of 8 kil., making a total of 18. When he stood up in his stirrups, the fore-hand received an addition of 12 kil. These gentlemen with justice observe, in concluding this account of their interesting experiment, that, 'although the differences caused by the position of the head and neck of the animal, and of his rider, may not, under ordinary circumstances, be of any great deal of consequence, yet do they acquire vast importance in the course of work, such as racing or hunting, the preponderance increasing enormously along with fatigue'."

We are practically aware, then, that the fore-limbs sustain more weight than the hinder ones; they consequently stand nearer the centre of gravity, so that when a horse stumbles during action, the weight is often thrown so far beyond its base of support, as to bring the animal down forward in spite of himself. But any uniform centre of gravity in horses is difficult, and perhaps impossible to determine, because of those changes in size and position which continually occur among the abdominal and thoracic viscera. If, however, the elongated quadrilateral ground space, included between the fore and hind-legs, be divided into four equal lengths, the line of gravity in a well-formed horse will fall near the end of the first length behind the fore-legs, that is, it will be three-fourths in front of, or distant from, the hind-feet, and one-fourth behind, or distant from, the fore-feet.

In horses, then, which are used as hunters, hacks, or for light harness purposes generally, it is obviously important that the head and neck should be light, and carried well elevated from deep slanting shoulders and well-raised withers; by means of this formation, and this only, the centre of gravity is thrown sufficiently behind the fore-legs to render their step light and secure. On the other hand, in cart, dray, or even in heavy race and omnibus horses, the shoulder should be more upright, but still very deep. This formation throws the fore-legs further backward, or under the body, and of course more directly below the centre of gravity. In the act of draught, such horses instintively depress, and continually oscillate the head and neck; by means of these adaptations, the line of gravity is brought in front of each fore-foot alternately placed upon the ground, and an available weight is thrown into the collar. How truly absurd, then, is the habit of reining up a draught-horse's head, and yet compelling him to draw a heavy weight. This practice of tightly reining heavy horses may gratify the morbid taste of those who ever seek to destroy such useful provisions of nature as they cannot learn to value. The custom, however, is too expensive and too barbarous to gain sanction in this part of the kingdom, because you know that heavy draught work requires not only a certain massiveness of trunk and limb, but is rendered easier of performance when trunk and limbs can act in concert with the unrestrained movements of a somewhat depressed head and neck. We see, then, that a light, well-raised head, an elevated, neatly-turned neck, and deep slanting shoulder, are points of beauty as well as utility in horses required for leaping and rapid action; but a heavier (yet not a coarse, clumsy) head more humbly carried, and a stronger neck rising from a very deep, but far more upright shoulder, have also their utility in horses required for heavy slow draught alone.

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* A kilogramme is equal to 2 lbs. 3 oz. 4⅓ drachms avoirdupoise.

It may be asked, is their no mathematical rule by which we can infallibly decide whether a horse's chest is good or bad? I am afraid we are not yet in a position to apply such a test. The human body is artistically divided into the well-known *eight heads* in length; but the bodies of many, and perhaps of most living men, will not conform to such a standard. The horse's head has also been used as measurement for his body, but it cannot be uniformly applied. Different purposes require horses of different proportions. Every horse, too, must be judged of, not by his formation only, but by his action also; for we must confess that some apparently handsome horses move very badly, while animals of more homely appearance have sometimes good action. So far as the chest is concerned, we may for most practical purposes assume (except in the case of racers and horses valued for speed only), that a horse is too long in limb, and too shallow in chest, if his measurement from the ground to the lowest part of the breast should exceed his depth from the lowest part of the breast to his withers. In draught-horses these two lengths should be about equal, and, as before stated, the chest can hardly be too wide in this region as well as elsewhere.

In racers, again, or in other horses valued mainly for their speed, the limb from the breast downward will often measure nearly the foot and pastern longer than the height from the breast upward. In a well-formed draught-horse, we also find that the lower central line or swell of the abdomen is fully as prominent as the posterior end of the breast, and the vertical measurement from the middle of the back to the middle of the abdomen should be about equal to the width of the chest at its widest part. By this formation, rotundity of "barrel" and "well-ribbed up flanks" are ensured. In horses required for rapid speed, and intended to carry light weights, this rotundity may be somewhat sacrificed for an increase of depth.

Turning our attention shortly to the *ox*, we find the bony framework of his chest to consist of *thirteen* dorsal vertebræ, *thirteen* ribs on each side, and a large breast-bone. The withers, if such we may call them, do not rise very perceptibly above the back and loins; hence the ox carries his head low. The upper line of the neck, in fact, in well-formed animals, is almost a continuous level with the back and loins. There are *eight true* and only *five false* ribs on each side. The true ribs are peculiar for joining their cartilages by means of synovial or true joints, and for being relatively longer than those of the horse. All the ribs are much broader and straighter than in the horse, and in some breeds of cattle these bones become quite peculiar for their slight rotundity, or arching outwards. The breast-bone is remarkably long and broad; about three inches from its anterior end, a joint extends right across this bone, and becomes continuous with the sternal joints of the second pair of ribs. Below this joint, lying between it and the skin, is the well-known fibrous and fatty cushion of the brisket. The chest of the ox, then, is deep, short along its roof, narrow between the costal arches, but broad and long in its floor. The sternum is longer in proportion, and several times broader than in the horse. Owing to this comparative depth of chest, and accompanying width of its floor, the broad breast-bone descends low down between the arms. The shoulder-joints appear somewhat high, the elbow-joints are thrown far backward, and seem pushed widely outward by the wide chest floor. If the fore-legs formed parallel perpendicular pillars from the elbow downward, the feet would be so widely separated as to give the animal a most uncomfortable gait. In order, however, to bring the fore-feet sufficiently under the centre of gravity, the arm bones incline inward as they descend from the widely-everted elbows, and the knees stand nearer together than in the horse. The limbs below the knees are straight, or ought to be; but the knees themselves incline rather backward as well as inward. A perpendicular line let fall before the limb, from the centre of the shoulder-joint into the space between the digits, divides the shank, pastern, and foot, into two lateral halves, but leaves most of the elbow-joint and upper end of the arm bone (radius) outside. This eversion of elbow, then, is due to depth and width of chest below. Shortness of dorsal region is due (in part, at least) to increased length of loins. In consequence of his long loins, an ox is not adapted for carrying heavy weights; but length of loin is needed here, in order to give sufficient room for the enormous stomach lying below. In horses the *back* is longer certainly (but then it is strengthened by means of five ribs on each side additional to what exist in oxen), and the loin region is short, for long loins would involve too great liability to weakness where weight has to be sustained. Such shortness of back, however, and flatness of side in oxen, would injuriously lessen the lungs, if the chest floor were not increased in breadth, depth, and length. This lower portion of a horse's chest undergoes little change of size during respiration; his ribs more widely arching and moveable above, render such change unnecessary, and the flattening ensures good attachment for his weighty fore-limbs. In oxen, however, a modified muscular apparatus acts upon the ribs in this region, so that by means of their additional joint each, and by means also of the sternal joint, a great amount of respiratory motion is secured in parts where a horse's chest is almost motionless. This action of the chest floor is illustrated in cattle affected with pulmonary disease. A horse, for instance, when labouring under pneumonia, will never lie down; if he rests upon the ground, his breast-bone bears little weight, and pressure falls so directly upon the ribs as to aggravate any existing difficulty of respiration; therefore he stands. The ox, however, often lies when affected with chest disease, because the prominent sternum (especially at its jointed part), by means of its fibro-fatty pad, bears freely upon the ground and sustains weight; in thus resting, it presses the ribs upward, which, being jointed to their cartilages, are made to bulge further outward, and the chest becomes actually expanded. Thus an ox can lie down and breathe with comparative ease under circumstances which compel the horse to stand. Owing to shortness of back, flatness of rib, and length of loin in the ox, his flanks are not well ribbed up, but a wide, loose, triangular space is left in these regions. This space is of great use in permitting those great and sometimes sudden changes of size, which the stomach undergoes.

In this country, oxen are not much employed in draught, or other kinds of labour involving great expenditure of muscular power. They are mostly kept for feeding purposes only; yet, even for these ends, it is highly desirable that they should possess good muscular development. Let me again remind you that good muscular development cannot exist without a well-formed chest. An ox possessing a flat chest, and no prominence of muscle, may be made fat enough in time; but such an animal always handles unpleasantly in the skin; he is deficient in firmness of flesh, and does not weigh well in proportion to his cost of feeding. An animal always handles best, his meat is ever most grateful to eat, and weighs best, when a large quantity of fat is equally intermixed with a large quantity of lean. To attain this mixture, the muscles must be well developed to begin with: they must consist of large masses, so that the process of feeding may separate the fibres of flesh, and enclose each in a case of fat. By these means only are firmness, weight, richness, and tenderness of flesh attained; for unless the muscles are naturally large and well formed, fat will collect unequally in different regions, and the meat will satisfy neither butcher nor epicure.

In order, then, to secure this essential muscular development, we must secure a *good chest*. A good chest in oxen and cows has abundant depth; in some choice animals this depth is so great that the dewlap hangs below the knees, the ribs are well arched, the barrel is consequently round, and the flanks are small. It may be well to remark, that this roundness of chest has been very much increased of late years, and is a consequence of judicious breeding. The wild or indigenous cattle of all countries are inclined to be flat-sided; the improved breeds of our own country have become increasingly round and deep-chested, for the breeder experimentally knows that these are good points. A flat-sided beast is usually hollow in the back, because his straight ribs do not support the spine so perfectly as ribs possessing more decided arches, and because straight flat ribs always involve deficiency of muscle in those regions where flesh ought to be heaviest and most valuable.

In conclusion, I may further remind you that these points of good or bad formation are all transmitted from parents to offspring. Knowing, then, that a bad chest is the source of evils perhaps more numerous and more serious than follow any other single cause, let me entreat you to breed from animals which are broad, round, and deep-chested; but beyond and above all things, avoid breeding from those which are narrow, flat, and shallow-breasted.

At the conclusion of the address, the chairman expressed how much the meeting must have been gratified by the able address now delivered, which not only agriculturists, but everyone having to do with horses might profit by.

Mr. Finnie then moved a vote of thanks to the chairman, after which the meeting separated.

EXPERIMENTS WITH WHEAT AND OATS.

We have the pleasure of bringing into public notice the results of some experiments that were made last year for the information of the St. Quivox Farmers' Club.

We are enabled to state that these experiments were conducted in the most careful manner. From the sowing to the thrashing and winnowing, everything requisite was done to ensure accuracy. Without such attention, experiments may be worse than useless—they may lead people astray instead of guiding them to correct practice.

The first experiment was in the growth of wheat, after clover, an attempt that is seldom made so far north as Ayrshire. The soil where the experiment was made is a medium loam, and in good condition. The field has a southern exposure, is well sheltered, and the highest part of it is not a hundred feet above the level of the sea. In 1851 the field was green-cropped, and in 1852 it was cropped with oats, and sown out with 20lbs. of red clover to the acre. Heavy cuts of clover were obtained from it in 1853. The land was ploughed and sown with Tibbald's red wheat in October 1853. The seed was obtained from Mr. Gibson, Woolmet. The only application to the soil was a dressing of forty bushels of quicklime to each acre.

The result of this experiment has proved highly satisfactory. The extent of the field is 5¾ Scotch acres, or a little more than 7 imperial, acres; and the produce amounted to 36 quarters of cleaned wheat, and 20 bushels of light wheat.

No ryegrass was sown with the clover. This is a fact of importance, though it might be overlooked by some Scotch farmers. Ryegrass is a cereal plant, and if it be grown and allowed to run to seed, there must be less available nourishment in the soil for a cereal crop the following year.

The other experiments to which we shall at present allude, were instituted for the purpose of showing the comparative value of some of the portable manures. The field was ploughed after two seasons of pasture. The soil is a medium loam, and of a nearly uniform quality. Berlie oats were sown towards the latter end of March, and the manures were harrowed in with the seed.

Nitrate of soda, sulphate of ammonia, and Peruvian guano were the manures used. They were applied in quantities proportionate to their expense —nearly the same money value of manure being put upon each lot. No. 1 was dressed with nitrate of soda, at the rate of 1 cwt. per imperial acre; No. 2 with 1 cwt. nitrate, and in addition 2 cwt. common salt; No. 3 with 1½ cwt. guano; No. 4 with 1 cwt. 5lbs. sulphate of ammonia; and to No. 5 no manure whatever was applied. The land was in condition for yielding a good crop without any manure. This circumstance lessened the probability of much profit being derived from the applications.

We give the results in a tabular form. The produce is calculated by the imperial acre, and in bushels of 40lbs.:—

No. 1, ...	65	bushels	30	lbs.
„ 2, ...	71	„	4	„
„ 3, ...	71	„	7	„
„ 4, ...	69	„	9	„
„ 5, ...	63	„	9	„

The cost of the manures would be about eighteen shillings per acre on Nos. 1, 3, and 4 respectively; and on No. 2 about twenty shillings and sixpence, Valuing the oats at 3s. 3d. per bushel, there is a small profit from 2, 3, and 4. Contrary to expectation, the application to No. 1 gives little increase. It is possible, however, that there may have been some disturbing cause—some unobserved varying circumstance, such as occasionally perplexes the student of agriculture when he seeks to draw conclusions from experiments.

One conclusion, however, we think, may with safety be drawn from the results of these experiments with manures—that there is no light manure for top-dressing cereal crops on which the Scottish farmer can rely with as much confidence as on Peruvian guano.—Ayr Advertizer.

PRACTICAL REMARKS ON VEGETABLE GROWTH.

Sir,—Having been often gratified with many of the well-written articles in your Journal, allow me in return to offer you the following practical remarks, which have been found useful during many years:—

1. Vegetable growth depends mainly on four things—light, heat, air, and moisture. Great care must, therefore, be taken to obtain the aid of all those agencies. First, by not cramming plants closely together. More injury has been done to potatoes by closely planting the sets than from any other cause. A stream of air should be allowed betwixt the rows (in rich soils two feet six inches, in light soils not less than two feet); otherwise, in moist seasons, the tubers being shaded lying at the bottom of the stalk, pommes-de-terre *cannot* ripen; and an unripe potato is hurt to man and beast.

2. This rule equally applies to fruit-trees. The system of roots, in every instance, is a distil vessel, secreting a certain quantity of sap. This must be economized, with attention to the size of the stem, and strict attention be paid to proportion the number of branches to the power of supply. If the branches are too many, and are carried too far from the centre or stem of the tree—if you have too much shoot, you cannot have fruit; and, *vice versâ*, if you allow too much fruit, you destroy your fruit-branches for the next season.

3. Again: at this season remove a superabundant quantity of bloom from your trees. In some trees there is a tendency to spend the sap in excessive bloom. This must be corrected. By removing unnecessary

branches, and all spurs and buds with redundant bloom, the fruit-tree is relieved of a burden which hinders the development of its active powers, and will richly repay your true attention.

One general remark, and I have done. Whatever is doing no good is doing harm: every branch which is left should have a decided reference to present or future benefit.

I trust you will allow me to say, in conclusion, a garden is the retired man's greatest relaxation; and, as a great writer remarks, "Man lost his innocency in Eden, and so in a garden man has often recovered it."

With much respect, I am, sir,
servant,
J. H.

BRITISH JURORS FOR THE FRENCH EXHIBITION.

(FROM THE GAZETTE.)

The Lords of the Committee of Privy Council for Trade and Foreign Plantations having been requested by the Imperial Commission for the French International Exhibition to appoint forty ordinary jurors and ten supplementary jurors to take part in the deliberations of the general juries of the industrial part of the Exhibition, have nominated the following persons :—

Class I.—Mining and Metallurgy.—Jurors.—W. J. Hamilton, President of the Geological Society; and Warington Smyth, F.G.S., Professor of Mining and Mineralogy in the Government School of Mines, and Inspector of Mines to the Duchy of Cornwall.

Class II.—Forestry, &c.—Juror.—Sir W. Hooker, F.R.S., Director of the Royal Gardens, Kew.

Class III.—Agriculture.—Juror.—Evelyn Denison, M.P., Member of the Royal Agricultural Society of England.

Supplementary Jurors.—John Wilson, F.R.S.E., Professor of Agriculture in the University of Edinburgh; and C. W. Amos, Consulting Engineer to the Royal Agricultural Society of England.

Class IV.—Machinery in General as applied to Industry.—Jurors.—George Rennie, C.E., F.R.S.; and Rev. Canon Moseley, M.A., F.R.S., Corresponding Member of the French Institute and Chairman of Jury on Machinery in 1851.

Class V.—Railway Machinery, Coaches, and Harness.—Jurors.—T. R. Crampton, C.E., Engineer to the Submarine Telegraph between France and England, for Railway Machinery; and the Right Hon. Lord Shelburne, M.P., for Coaches and Harness.

Class VI.—Machinery for Workshops.—Juror.—W. Fairbairn, C.E., F.R.S., Corresponding Member of the French Institute and Juror in 1851.

Class VII.—Machinery for Woven Fabrics.—Juror.—Rev. R. Willis, M.A., F.R.S., Professor of Natural Philosophy, Cambridge, and of Mechanics in the Government School of Mines, and Juror in 1851, aided by the Jurors for Woven Fabrics.

Class VIII.—Arts relating to the Exact Sciences and to Instruction.—Juror.—Sir David Brewster, F.R.S., Member of the French Institute, and Deputy-Chairman and Reporter of the Jury of Philosophical Instruments in 1851; and J. Carter, Alderman of the City of London, and Chairman of the Metropolitan Committee of Watch and Clockmakers.

Supplementary Juror.—Dr. Tyndal, F.R.S., Professor of Physics in the Royal Institution of Great Britain.

Class IX.—Heat, Light, and Electricity.—Jurors.—C. Wheatstone, F.R.S., Professor of Experimental Philosophy, King's College, Corresponding Member of the French Institute; and Dr. Neil Arnott, F.R.S.

Class X.—Chymical Manufactures, including Paper.—Jurors.—Thomas Graham, F.R.S., Master of the Mint, Corresponding Member of the French Institute, and Deputy-Chairman and Reporter of the Chymical Jury in 1851; and Warren De la Rue, F.R.S., Reporter and Juror in Exhibition of 1851.

Supplementary Juror.—Dr. Hofmann, F.R.S., Professor of Chymistry to the Government School of Mines, and Juror and Reporter in Exhibition of 1851.

Class XI.—Alimentary Substances.—Juror.—R. Owen, F.R.S., Corresponding Member of the French Institute, and Chairman of the Jury on Alimentary Substances in the Exhibition of 1851.

Class XII.—Hygiene, Pharmacy, Surgery, Medicine.—Jurors.—Sir Joseph Olliffe, Physician to the British Embassy in Paris; and Dr. Royle, F.R.S., Professor of Materia Medica in King's College, Scientific Referee to the Hon. East India Company on the Vegetable Substances of India, and Juror in 1851.

Supplementary Juror.—Edwin Chadwick, C.B., late Member of the General Board of Health.

Class XIII.—Naval and Military Arts.—Jurors.—Lieutenant General Sir John Burgoyne, G.C.B., Inspector General of Fortifications, and Juror in 1851; and J. Scott Russell, F.R.S., shipbuilder, late Secretary to the Royal Commission for the Exhibition of 1851.

Class XIV.—Civil Engineering.—Juror.—I. K. Brunel, C.E., F.R.S., Engineer to the Great Western Railway Company, and Chairman of the Jury on Civil Engineering, in 1851.

Supplementary Juror.—Charles Manby, C.E., Secretary to the Institution of Civil Engineers.

Class XV.—Steel, and its Products.—Juror.—T. Moulson, the Master Cutler of Sheffield.

Supplementary Juror.—J. J. Mechi, F.S.A., Juror in Exhibition of 1851.

Class XVI.—General Metal-work.—Jurors.—W. Bird, Deputy Chairman of Jury on Iron in Exhibition of 1851; R. W. Winfield, Manufacturer in Birmingham, and holder of a Council medal of 1851.

Class XVII.—Goldsmiths'-work, Jewellery, and Bronzes.—Juror.—The Most Noble the Marquis of Hertford, K G.

Class XVIII.—Glass and Pottery.—Juror.—J. Hartley, Esq., manufacturer of glass in Sunderland, and Medallist in 1851. The Juror for Pottery is not yet appointed.

Class XIX.—Cotton Printing and Dyeing.—Jurors.—T. Bazley, President of the Chamber of Commerce, Manchester, one of her Majesty's Commissioners for the Exhibition of 1851; and Walter Crum, F.R.S., Calico Printer and Bleacher, in Glasgow.

Class XX.—Woollen and Worsted Manufacturers.—

Jurors.—S. Addington, Esq., Woollen Merchant, Stroud, and Reporter of the Jury on Woollen Cloths in the Exhibition of 1851; and Samuel Smith, Dyer, President of Chamber of Commerce, Bradford.

Class XXI.—Silk.—Juror.—T. F. Gibson, one of Her Majesty's Commissioners for the Exhibition of 1851.

Supplementary Juror.—T. Winkworth, Reporter to the Silk Jury in the Exhibition of 1851.

Class XXII.—Flax and Hemp.—Juror.—Erskine Beveridge, Linen Manufacturer, Dumfermline.

Supplementary Juror.—James M'Adam, jun., Secretary of the Royal Society for the Promotion and Improvement of the growth of Flax in Ireland, and Honorary Secretary to the Belfast Committee for the French Exhibition.

Class XXIII.—Hosiery, Carpets, &c.—Jurors.—W. Felkin, Chairman of Jury on Clothing in 1851; and Peter Graham, Upholsterer, and Juror in 1851.

Class XXIV.—Furniture and Decoration.—Jurors.—His Grace the Duke of Hamilton, and Digby Wyatt, Architect, Secretary to the Executive Committee of the Exhibition of 1851.

Class XXV.—Miscellaneous and Ornamental Objects.—Juror.—The Right Hon. Lord Ashburton, F.R.S., Deputy Chairman of Jury on Furniture in 1851.

Class XXVI.—Printing, Photography, &c.—Juror.—Charles Knight, Publisher.

Supplementary Juror.—Thomas De la Rue, Esq., Chairman of the Metropolitan Committee of Paper-makers and Stationers for the Paris Exhibition, and Juror in 1851.

Class XXVII.—Music.—Juror.—The Right Hon. Sir George Clerk, Bart., F.R.S., President of the Royal Academy of Music.

DRAINING.

> "Our experiments should be directed by reason, not by chance. We should obtain all that which is obtainable by rational inquiry into nature and her laws."—Varro.

I do not assume to teach others, but beg in the simplest manner to justify my own practice and opinions.

Agriculture is ceasing to be a mere routine "gee wo" occupation, and is properly taking its station amongst its kindred and dignified sciences. And one of its unmistakeable manifestations is the attention now being given to correct drainage. The evils of undrained land had not escaped the observant eye of the late Sir Walter Scott, for in "Old Mortality" he says:—"Trenches filled with water, out of which peats and turf had been dug, and here and there some straggling thickets of alders, which loved the moistness so well that they continued to exist as bushes, although too much dwarfed by the sour soil and stagnant bog-water to ascend into trees." And Liebig informs us that, "The plants of every former period of the earth's history are distinguished from those of the present by the inconsiderable development of their roots. The fruit, leaves, seeds, and nearly every part of the plants of a former world, *except the roots*, are found in the brown coal formation. But when we examine oaks and other trees, which in consequence of revolutions of the same kind occurring in later ages have undergone the same changes, we never find their roots absent." This is an important fact, and can be explained in half a dozen words: the earth was not then drained.

A timber-tree, placed on bog or wet soil, is stunted in growth, false at heart, and gnarled in appearance; the roots refuse to enter the stagnant unwholesome water, sending off a few slender horizontal shoots, which soon exhaust the surface soil and all that is therein contained. And his race is run!

Again, a plant placed in a closed vessel, in which, therefore, the carbonic acid cannot be renewed, dies exactly as it would in the vacuum of an air-pump, even though its roots be fixed in the richest mould; and small better luck has the plant stuck in an impervious undrained soil even though its roots be bathed in a never-failing pool of stagnant water.

In several of the midland counties iron in combination with some of the acids is found in the earth more or less soluble in water, and in some localities is in this state brought to the roots of plants in such excess as to prove highly injurious, if not positively poisonous, to vegetation. To ameliorate which, lime, chalk, or marl may be tried; but perfect drainage is the only effectual mean by which such land can be sweetened and rendered fertile.

Should this, my No. 1, find favour in your eyes, I will resume the subject at your next convenience.

I am, sir, yours &c.,

Adderbury, Oxon. Edwin Wilson.

TREACLE AS AN ARTICLE OF FOOD FOR CATTLE.

Sir,—Having been requested from various quarters to give the result of my experience in the use of treacle as an article of food for cattle, and as it may be considered rather a successful experiment, I unreluctantly comply.

At the commencement of the present year, when all descriptions of feeding stuff were becoming scarce and unusually dear, it seemed of importance that every product of the farm containing nutriment, however small, should be made available. Upon referring to the table of chemical equivalents published by Professors Johnston, Way, and others, we find that straw contains a considerable portion of nutritive matter; too much at such a time to be thrown away, but at the same time too little for consumption without additional aid. Sugar first suggested itself as affording the best combination. The value of most of our roots, hay, &c., being in a great measure determined by the amount of saccharine matter which they respectively contain, I accordingly (from a slight previous acquaintance) called on Messrs. Cottam and Morton, the eminent West India firm, Lime-street, City, where I found the advantage decidedly in favour of the best quality of treacle. The lowest description of sugar paying a duty of £11 per ton and treacle £4 5s., the cost price of the latter (duty paid) being £16 10s. per ton, or about 1¾d. per lb., all expenses paid. This I procured, and have been using for my breeding ewes, young sheep, beast, and calves, and my cart horses, with equal parts of cut wheat-straw and hay. For my purpose a good-sized horse-power cuts in one day a sufficient quantity for four days' consumption, sprinkled by means of a common watering-pot with a solution made of three-parts of boiling water to one of treacle, and well mixed afterwards. As every animal is fond of sugar or treacle, I need scarcely say that it is eaten with avidity; and, so far as my experience goes, it is a safe and economical means not only of feeding, but adding wonderfully to the resources of every farmer who delights in stock keeping. I am not certain whether good wheat or barley straw, well moistened with the solution of treacle, is not equal to the best hay: unquestionably much more so than the hay from coarse or low meadows. I have, therefore, no hesitation in confidently recommending the use of treacle in the manner described, whether as the vehicle for rendering straw consumable, or intrinsically. At the present moment I believe it is a cheap and valuable article of food.

I am, sir, yours faithfully,

Wickham Market, May 9. Corn. Welton.

PROSPECTS OF AMERICAN FARMERS FOR 1855.

There never has been a brighter prospect opened farmers of the United States for the coming, and probably many successive seasons. Three of the leading commercial nations of Europe, and a fourth —a second-rate power—embracing 200,000,000 people, are engaged in mortal combat, striving, by every possible means, to reduce the products and resources of each other, and render them unavailing for their own use, or that of neighbouring nations. Already they have shut up the interior of a continent, that has hitherto supplied no inconsiderable share of the European demand for wheat and other breadstuffs. The immeasurably extended and fertile plains of Austria and Southern Russia are hermetically sealed against the export of a single cargo of the staff of life, and they may thus remain till the close of the present European war. In addition to the comprehensive hostilities that now prevail abroad, Austria assumes the attitude of " the fretful porcupine." She stands bristling with 500,000 sabres and bayonets; and on the dawn of spring, it would not be surprising to find all Europe marshalled on one side or the other of this hostile fray.

It is inevitable, in the withdrawal of the immense amount of human labour from the cultivation of the soil, which these operations insure, that every article of consumption must continue at very high prices, if they do not exceed the present exorbitant rates. Almost every eatable—flesh, grain, vegetables, are worth near double their average rates, and this, too, when manufactured and other articles of necessity are unusually cheap, and probably below their customary value. Thus while the farmer is getting twice as much for his crops as he has been accustomed to, he is paying less for every necessary article required for his consumption.

Labour is the only exception to the advantages the farmer has now in his hands, and this he may reduce to the most inconsiderable point, by the introduction and use of the many labour-saving machines, invented and perfected within these late years for his especial benefit.

He may now plough and harrow with vastly better implements; he may plant his corn and other seeds, or sow his grain, with the most perfect and accurate seed-sowers; he may cultivate his crops with implements adapted to every conceivable purpose; he may cut his grass with a mowing machine, and his grain with a reaper, and rake both with a revolving rake; he may thrash and winnow his grain and shell his corn by machinery: all these, and innumerable other operations about his farm, he may accomplish by horse or steam power, with a slight superintendence and aid of human intellect and labour; thus placing it in his power to become, in a great degree, independent of increased wages. Let no man complain then of high-priced labour, till he has first supplied himself with every labour-saving machine he can possibly use with advantage on his farm.

But the advantages we predict for our agriculturists can be realized only by the intelligent and the industrious. If you don't raise the crops, you will surely not be paid for them. Set vigorously to work at once, and prepare your field as soon as the frost will permit; provide your manures, and if you have not enough already to give an ample dressing to all your cultivated acres, procure them elsewhere; ashes, plaster, guano, bone-dust, superphosphate of lime, and whatever your own experience or that of your neighbour indicates as best suited to your proposed crops, and which can be readily procured; *get the best seeds and the best implements to be had;* adopt the most judicious systems of cultivation; and put every idle hand you have about you to the plough and the active labours of the farm; and our word for it, you will have no cause to complain of the occupation or the times, for any lack of success you will encounter.

Farmers of the United States! you have the most honourable calling that ever engaged a class in any nation, ancient or modern—you have now an opportunity of making it the most lucrative—it will be your own fault if you do not improve it. Do not, with the foolish expectation of seeing your sons or dependants succeed better elsewhere, drive or allow them to be drawn away to other more promising (*but only promising*) pursuits, mercantile, professional, or otherwise. Attach them to your own honourable calling, and let them impart to it whatever they can bring to its aid, of intellect and muscular vigour, and you will be liberally rewarded in their certain and abundant success. You need not apprehend producing an over-supply. Our granaries, and those of Europe, are now so much exhausted, that there is no danger of filling them to repletion for two years to come, even if a universal peace were proclaimed to-morrow.—American Agriculturist.

THE WOODS AND FORESTS.

The appointment of the Honourable J. Kenneth Howard to succeed Mr. Kennedy as Commissioner of the Royal Woods and Forests has already given rise to sundry surmises and enquiries, the result of which we hope will be satisfactory and useful to the public interests. But amid the strife of contending parties and the wailings of disappointed competitors, such public interests will stand a fair chance, we fear, of being regarded as a minor consideration. Let us then endeavour to collect together a few facts relating to the past management of the Woods and Forests for the consideration of our readers—truths which are not very generally known. First, then, as to the extent of these Woods—forests extending from Chopwell, in Durham, to Parkhurst, in the Isle of Wight—does one Englishman in ten believe that these cover an extent of about 50,000 acres? Yet such is the fact. From a paper now before us we find that—

The New Forest contains about	6,000	acres.
Dean Forest	11,000	„
Woolmer	1,700	„
Alice Holt	1,892	„
Bere	1,417	„
Salcey	1,285	„
Windsor	4,402	„
Delamere	4,641	„
Parkhurst	900	„
Wychwood	1,841	„
Whittlewood	3,378	„
Other lands	14,393	„
	52,849	acres.

It would be reasonable to conclude that from such an extent of forest-woods, covering between 60 and 70 square miles, considerable profit would be derived by the public, not only from the sale of the produce, but from the timber supplied to the royal dockyards. Will our readers be prepared to learn that the combined results of ignorant management, jobbery, and fraud, ended in the year 1850 by producing from about 50,000 acres of woodland the net sum of one hundred and fifty-nine pounds seven shillings, or about three farthings per acre!! Will our readers be surprised to learn, after this startling fact, that it all ended in no one being found responsible? no one person being punished? that although some of those who had the care of the Forests were found deplorably ignorant of everything relating to forest trees, yet they were neither discharged forthwith, nor those greater and more unprincipled officials who made the appointments removed? It is idle to say that nothing more could be produced from these great national domains; for, in consequence of some stir being then made, a new Commissioner was appointed. And in 1851 and 1852 the effect of his efforts displayed itself in the following net income being derived from the chief forests:—

	1851.			1852.		
	£	s.	d.	£	s.	d.
New Forest	3,151	11	8	9,079	2	4
New Park Farm	419	5	11	189	9	10
Parkhurst	—			31	9	9
Dean	48	4	5	4,369	0	1
High Meadow	1,406	15	6	2,099	1	0
Alice Holt	699	7	7	2,142	17	9
Woolmer	188	2	5	506	10	4
Bere	680	19	1	683	8	8
Whittlewood	1,822	8	3	1,200	9	11
Salcey	—			—		
Delamere	864	18	10	410	14	8
Wychwood	196	8	10	2,135	10	11
Waltham	164	15	4	—		
Chopwell	237	15	9	300	15	0
	9,875	8	7	23,148	9	10

In the year 1853 the net income was £39,748 11s. 8d.; in 1854, £26,028 15s. 7d.

It is needless to dwell upon the reflections which such a detail suggests: it will be a much more useful enquiry as to the possibility of attaining still more valuable results. Is there not in almost all these Royal Forests much to be readily accomplished in draining, in marling, or claying, or chalking? Might not, in many districts, the soil of these be profitably trenched for the reception of young trees? Is there the least necessity for covering large plots in the New Forest with no better trees than Scotch firs? And if it be said that the task, in a pecuniary point of view, would not repay the outlay, then we ask why not employ in these works, in the proper season for such outdoor works, the convicts who now tenant the hulks, or are earning the wages which honest men would otherwise receive in the convict depôts?

It is astounding wretchedness, in any view of the case, to proceed as we have hitherto done—sacrificing the forests to the fruits of official patronage and official routine. For once, at least, let us endeavour to accomplish better things. Let some independent member only move that the Forests shall be either sold or placed under proper management, and the result will speedily be shown, whichever alternative is adopted. If skill and science are not to be employed in rendering them worthy of being called Royal Forests, then the sooner they are sold under the authority of the Enclosure-Commissioners, the better it will be for the character of those concerned in their present management, and the true interests of our country.

THE INCLOSURE OF COMMONS.

It may seem a very antiquated task to write respecting the Inclosure of Commons, but it is nevertheless a fact that many parishes in different counties have not yet effected this improvement. We refer not to wastes and moors requiring heavy outlay for reclamation, but to ordinary open fields, common pasture or meadow. Even in such close neighbourhood to the metropolis as the county of Surrey, we have yet considerable tracts of open common; though, perhaps, consisting mainly of down or heath, not to be converted into farms without great expense, and much of the surface fitted only for sheep-folding. In Suffolk, there are commons still to be found in the heavy-land portion of the county; and doubtless, having a soil of productive quality, can present no insuperable obstacle to inclosure.

In Cambridgeshire, we believe, there are still four or five parishes having a remnant of the old system, and standing in need of the civilized husbandry introduced by inclosing.

Even in the populous, food-consuming West Riding of Yorkshire, the low-land commons are not yet all divided. What a contrast is presented by "open-field" land and regular ring-fence occupations! Mr. Caird found an example, in a parish in Berkshire, where one farmer's fields are intermixed with those of another in picturesque confusion, but producing great inconvenience and expense in management. "One consequence to which this leads is," he says, "that a man who farms much better than his neighbour, expending more capital, and getting his land into higher condition, reasonably objects to what would otherwise be a most desirable improvement—an inclosure and new distribution of the land, as he must suffer in being compelled to take what is out of condition, in lieu of that which he has, at so much cost, put into condition. The rector of the parish, in the case referred to, has between 50 and 60 acres of land, which he cultivates on his own account, scattered in fifty different places among the fields of his parishioners, through any of which he has, of course, right of access!"

Our readers will find, also, from Mr. Read's Prize Report on the Farming of Oxfordshire, that numerous parishes of that county remain in open field, in spite of a great extension of inclosures; and the disadvantages of this condition are graphically enumerated. "Persons living at a distance cannot comprehend the miseries of common field. They could hardly credit that a parish, containing 1000 acres, should be cut up into 1200 or 1300 strips; that the whole parish must be cropped on one course, and that the meadows belong to one individual from the 1st of May to the 1st of August, and are afterwards commonable to the whole parish. Then there is the loss by trotting from one piece of land to another; the trouble occasioned to the farmer in overlooking a small farm; the certainty of distemper, such as the pleuro-pneumonia in cattle, or the foot-disease in sheep, being disseminated, if once introduced, over the whole parish; the impossibility of draining detached half acres; and the constant source of quarrels from trespassing and ploughing on another's land. In some open-field parishes the lands are large, and the meadows not Lammas ground. Here the benefits derivable from inclosing are not so great; yet numerous advantages would well repay the trouble and cost of an allotment." The expenses of inclosure there are not very heavy, for very frequently fences are made only by roads and the boundaries of properties. The charge—from 15s. to 30s. per acre, according to the extent of roads made—is defrayed either by the sale of some of the waste or common, or else levied upon the several proprietors. The legal part of the business presents little difficulty or cost; the different parishes to be inclosed being grouped in one Bill under the General Inclosure Act, and passed in the same session of parliament, while a valuer is appointed to set out the roads and fences.

There may be cases in which the inclosure of an open field would be an extremely difficult, if not a perilous undertaking, in consequence of peculiar conditions. Thus, in the north-west division of Lincolnshire, called the Isle of Axholme, are several thousand acres of open-field arable, tilled by innumerable small farmers, who have a rood here and a rood there, laid out in broad curved lands or stetches, the whole resembling a succession of gardens and allotments rather than farms. But the soil is an extremely fertile sand-loam or "garden soil," and is largely cropped with green vegetable produce for market. Besides wheat, other grain, and potatoes, the industrious cultivators raise great quantities of carrots and onions; so that, in fact, these open fields may be said to be market gardens, rather than semi-cultivated lands standing in need of inclosure. However, the small freeholders there abounding are wise enough to fence off their own patches, when they can obtain possession of a sufficient number of contiguous grounds.

In urging the inclosure of commons, and such open fields as plead no exceptional cause for remaining as they are, we would just add a word on behalf of the working classes. In most of the old reports on inclosures, while benefits are proved to have accrued to the farmer, the landlord, the church, and the public, the case of "the poor" is generally left doubtful; but, constituting, as they do, a large proportion of the population in every village, why should not their share of the gain be in equal proportion to that of the more prosperous classes? Inclosure of common pasture has often proved most burdensome and grievous to the poor; and one of their greatest privations has been their loss of fuel. A general report, published in 1810, relates that a journey of more than 1600 miles was made by an inspector, in order to examine the effect of inclosures upon the spot, from which it appeared that in very many instances the poor had been unquestionably injured. In some cases, they had been keeping cows without a legal right to do so, and of course received no compensation for the practice. Often where allotments were assigned to cottagers, they could not pay the expense of the measure, and were thus obliged to sell these allotments. A more usual case was, that, having kept cows by right of hiring cottages or common-rights, and the land being awarded to the proprietor, and added to the adjacent farms, the poor had to sell their cows, without anything to counterbalance this diminution of their means. A parliamentary committee, in 1800, found that, in twenty-nine cases out of thirty-one reported by the parish ministers, the poor had been sufferers by losing their cows and other stock.

We live now in very different times; and let us hope that, in any future improvements of the kind, it may no longer be said, "the inclosure of commons is beneficial, but their appropriation is unjust."

THE SPRING OF 1855.

The backwardness of the present spring naturally enough induces us to regard with more than ordinary interest the observations of the meteorologist. These have led to some useful remarks upon the rainfall of the season, and upon the temperature essential to the germination of seeds, which, although chiefly confined to those of the garden, may perhaps hereafter be applied to such as are still more valuable and essential to the sustenance of mankind.

The temperature of the month of April was more unusually low than is even commonly believed. The temperature of the nights, it is true, has been most frequently three or four degrees above the freezing point of water; but then occasionally it has been several degrees below 32 deg. Thus on the nights of the 1st and 2nd it was at 20 deg.; on the 5th, 21 deg.; on the 7th, 29 deg.; on the 18th, 21 deg.; on the 21st, 24 deg.; on the 23rd, 24 deg.; on the 25th and 28th, 27 deg. Need we, then, feel surprised that, exposed to such a low temperature, and with a dry wind almost constantly blowing from the east or north-east, producing a rapid evaporation, the wheat plant, especially on high-lying and exposed situations, is looking thin and miserable? From our own observations, confirmed by those made at Chiswick Gardens, this unusually low temperature has not been confined to the atmosphere, but has during the months of February, March, and the first twelve days of April, extended to the soil. In February, at a depth of a foot from the surface, it was 35·25 deg., the average of the previous ten years being 39·74 deg.; in March, 38·75 deg., the average being 40·96 deg.

"One practical lesson," observes a contemporary, "to be drawn from these important facts is, that seeds which might have been safely sown in February, 1846, ought not this year to be committed to the ground till April, and that nothing except the hardiest kinds can this year be safely sown before the end of the month; for until the earth at one foot below the surface reaches the temperature of 46 deg., a great part of the flower-seeds which are regarded as hardy, cannot be ensured from rotting, especially in the presence of wet weather. Physiologists know that seeds have their own specific temperature in which they indicate vitality. The seed of the nettle will not germinate at a temperature sufficient for groundsel, nor the Cape marigold in the temperature that suits the nettle, nor the cocoa-nut in that which is sufficient for the Cape marigold.

We are aware, also, that the seeds of some plants raised in a cold climate vegetate with more readiness than those from plants of the same kind ripened in a higher mean temperature: the same remark applies to certain shrubs and trees. Now it has never perhaps occurred to the farmer to try the effect of sowing in our rather warmer climate the seeds of field crops raised in Northern Europe —such as those of the swede and the common turnip — seeds which it is so desirable should germinate, and speedily get into their rough leaf.

It is true that by the use of superphosphate of lime this result is much more easily accomplished than formerly; but we are not without a strong suspicion, from the result of our own observations, that something useful might be derived from comparative trials with seeds raised on colder soils and at greater elevations than the land on which it is generally sown.

But it is not from a low temperature and strong drying wind that our field crops are suffering; rain has been steadily deficient: so that while the demand for moisture has been great, the supply has been reduced. The depth of rain which fell in the neighbourhood of London in the four first months of the last five years was as follows:—

	1851.	1852.	1853.	1854.	1855.
January	3.07	2.72	2.14	1.92	0.56
Februry	0.90	1.06	0.59	0.78	0.73
March	3.57	0.25	1.48	0.42	1.13
April	1.65	0.52	2.58	0.30	0.10
Total inches....	9.19	4.55	6.79	3.42	2.52

We see, then, that in the present year there has fallen only about 2½ inches of rain; a quantity less by about an inch than in the corresponding period of the dry season of 1854, rather less than the amount of the month of April, 1853, and an inch less than the depth which fell in the month of March, 1851.

We have been used to annually note the period when certain crops are first available, and the result in most cases accords with what might reasonably be expected from the varying warmth and moisture of the spring; one or two crops, however, grown in the open air, offer rather a curious exception to the general rule, and in no case is this more remarkable than in that of our asparagus beds; and these, it will be noted, are more adapted for such a comparative record than other vegetable products, since they are a permanent crop, occupying year after year the same position. The beds to which we allude are placed in rather a sheltered situation, protected from the north and east winds by a high bank; but possessing no unusual advantages of soil, which is a sandy loam. From these beds the first available cutting was, in the year 1850, on the 17th April; 1851, on the 25th April; 1852, on the 22nd April; 1853, on the 5th May; 1854, on the 17th April; 1855, on the 22nd April. It will be seen from this, that the difference is only about six days in five years; and that only in 1853 (the latest year) was there a difference of 18 days between that and the earliest cutting of six years.

We may here mention that we have treated these beds during the last two years with dressings of common salt, guano, and liquid manure, which has materially added to the vigour of the plants and to the copious produce of the beds. These are four in number, each being sixty feet long by about three feet in breadth, and furnished with two rows of plants, about a foot apart. As soon as the asparagus cutting-time is over, a small trench about two inches deep is made between the rows of plants, from one end of the bed to the other: along this little channel two or three pounds of the best Peruvian guano, and an equal weight of common salt, are sprinkled, and upon this about twelve or fifteen pailsful of the sewage from the house is poured; and when this is soaked into the bed, the whole is made smooth with the rake. The very same operation is repeated when the ripened asparagus stalks are cleared away in the autumn, before the beds are top-dressed with stable-dung for the winter; and again in March, when the dung is pointed in, and the beds laid up for the summer. We have occasionally, instead of the house sewage, employed a weak liquid manure, prepared by merely diffusing a portion of horse-dung through water.

THE COVERED HOMESTEAD—SILLYFLATT, N.B.

There is, perhaps, no part of the United Kingdom where covered homesteads are likely to be more beneficial than on the east coast of Scotland, including the counties of Aberdeen, Banff, Fife, Forfar, and Kincardine. This arises from the coldness of the climate and quantity of black cattle reared and fed. North and east winds are there frequent and piercingly cold, more especially between Peterhead and Dundee; while the quantity of butchermeat annually sent to the Metropolis from this district is not only large, but on the increase, independently of the increasing consumption at home. The management of live stock is the main-spring of farming; and that management involves the culture of turnips, grass, and straw in the greatest abundance, as every one knows. Guano and other artificial manures are increasing the quantities of these, thus accounting for the increased supply of butchermeat. Almost the whole straw is consumed as food for cattle. Young and old are taught to eat it, and do so greedily, after their turnips. Farmers are proverbial for their management in this respect. A pure and comparatively warm atmosphere, with a dry, clean bed, again, is equivalent to half food, or an increase of turnips, grass, and straw; while open or uncovered yards, where the whole straw is nearly consumed, involves not only a great waste of liquid manure, but of the volatile and more valuable elements of both the solid and liquid. Now, covered homesteads secure the former advantage, while they obviate the latter evil. Hence the demand for them, and the rapidity with which they are being erected, new ones everywhere springing up on this principle, while not a few old strawyards are being roofed over.

A few years ago, one of these covered homesteads was erected on the farm of Sillyflatt, near Bervie. It was among the first in the north, if not in the kingdom, and was lately pointed out to us, when in the north, as being considered not the least meritorious and worthy of notice. Accordingly, we paid Mr. Jolly, the tenant, a visit, and shall now briefly lay the result before the readers of the *Mark Lane Express*.

Sillyflatt is provincially termed a "corn-farm," in contradistinction from a "cattle-farm;" *i.e.*, it is a "strong wheat and bean soil," and not "a turnip and barley soil;" at the same time both the latter are grown. Tares may be profitably cultivated for in-door feeding, and ryegrass and clover for hay; but there is no meadow or permanent pasture for live stock during summer, the whole lands being under aration. These characteristics necessarily affect the quantity of buildings which it requires.

The homestead consists of five departments. *First*, thrashing and straw barn; *second*, cattle departments, including the turnip barns; *third*, stables; *fourth*, cart-sheds and implement houses, with granary over; and *fifth*, farm-house and garden. The three former make one building under a series of roofs; but the latter two are detatched, one on each side, the cart-sheds being on the east and the farm-house on the west, while the stackyard extends along the north and east (two sides) of the whole.

The corn and straw barns occupy the north of the middle buildings, the south wall of the straw barn forming the north wall of the cattle-yards, the thrashing departments projecting northwards at right angles to it from the centre. The straw is thus thrown from the machine into the middle of the straw barn, so that different kinds of straw can be kept separate. Bean-straw, for instance, may be thrashed and placed in one end; barley or wheat straw for litter, in the other; and oat-straw, or the finest of the wheat-straw, left in the middle for consumption, as food for stock, without any inconvenience to horse-men or cattle-men, or waste of good straw fit for eating by mixing it with coarse, only fit for litter. Every farmer, who has any experience in the straw-feeding of cattle, must be aware how much successful management depends upon this, and how soon cattle loathe their straw when it becomes mixed with inferior quality. In this respect, the economy of both food and litter has been duly consulted in the planning of the building.

Of the thrashing-machine and corn barn, we can hardly say so much, there being room for improvement, both in the motive-power, machinery, &c. The machine, for instance, is driven by water, and in applying this power, nearly £200 has been sunk in aqueducts, and some £40 more in a water-wheel—sums which would have erected a good fixed steam-engine. Now granting that there is a sufficiency of water during winter to thrash out the crops, which is very doubtful, yet such is not the question at issue, for modern improvements are not only pointing to as much thrashing during summer as winter, in order to supply litter for housefed cattle on grass, tares, &c., and fresh wheat for grinding, but also to the liquid-manuring or watering of grass lands, &c. If all the water available for thrashing between April and October were required for applying to the soil (and we have no doubt that Sillyflatt would consume the whole during the majority of seasons, were it equally distributed, and that this is the direction to which science is pointing), would not the tenant then feel the want of a fixed engine? We cannot, therefore, help thinking that the landlord, in making such an investment, has taken too circumscribed a view of the progress of things. Water forms a large proportion of the food of plants—in other words it is an invaluable manure—and there cannot be a doubt that science is pointing to a more economical use of it, and that practice will soon embrace her proposition.

With regard to the machinery, we are perhaps prejudiced in favour of English thrashing machines, and therefore shall only invite Mr. Jolly, with his landlord and agent, to visit Carlisle and judge for themselves.

The cattle department lies between the straw-barn and stable, the south wall of the former being its north wall, and the north wall of the latter its south wall. It is about 114 feet long by 72 in breadth, and is covered by three roofs, the outsides resting on two walls, the interior being supported by pillars. Two walls, it will thus be seen, one on the east side and the other on the west, serve for this building. In these are four doors, one at each corner, and windows for light and ventilation, besides the entrances for turnips and the removal of manure, &c., subsequently noticed.

The interior is fitted-up partly for stall-feeding and partly yard-feeding. On each side 20 feet are appropriated to the former, and the intervening space (32 feet) to the latter. This middle department is sunk some six or seven feet below the stalls, so as to hold the whole manure manufactured. The manure from the stables and stalls on each side, for instance, is daily spread over it; so that the whole is mixed in the most judicious manner, and, from being trampled under the feet of the yard cattle, is also effectually preserved. The urine as well as the solids from both is conveyed into it, and if more liquid is required, as is sometimes the case on corn farms with a limited supply of turnips, water can be thrown over it. If, on the contrary, the straw is kept forward for soiling in summer, either with clover, tares, or Italian ryegrass, &c.—the more commendable plan—and the yards get too wet, ground peat-earth, the dry ashes from the kitchen, burnt earth, dried seaweed, or any absorbent of this kind, may be added. Along this coast there is a large supply of seaweed; and we have no doubt that were it dried, stacked, cut into chaff by machinery when required, or ground into dust, and strewed over the yards, it would absorb a large amount of liquid manure, and possibly prove more valuable than when applied in its green state.

This manure yard is subdivided into three compartments for different ages or lots of cattle, each capable of holding from twelve to fourteen small polled beasts—the breed of the district. They have racks for straw swung from the roof, so that they can be elevated as the manure rises in the yard, and an abundant supply of water.

On the east side there are thirteen double stalls, capable of accommodating 26 fattening bullocks, with a passage in front for feeding, and another behind for littering and removing the manure into the yards. On the opposite side are eight double stalls, two small yards for calves, and the entrance to the interior yards from the outside—four stalls and a calf-yard being on each side of the latter. The stalls are capable of holding two beasts each, as on the other side, and the small yards six or eight calves each. Both also have a passage in front and behind.

The whole building will thus hold about 100 head of cattle, viz., 34 fattening bullocks, 8 cows, 16 calves, and 42 store beasts. There are no feeding boxes, but the interior yards can easily be fitted-up with some thirty of these should circumstances require it, so as to hold 30 fattening bullocks instead of 40 store beasts, as above. If the tenant, for example, wished to consume a field of tares, clover, or Italian ryegrass, in the house during summer, he could thus purchase in 64 bullocks, and fatten them for the metropolis. Such a lot would soon work up all the spare straw into excellent manure, and fetch something considerable for their grass, if of as good a quality as those he is now consigning to Mr. Collins—the last lot of eight being reported the best in Smithfield.

The two turnip-barns are situated one on the east and the other on the west side of the cattle department just noticed, with entrances into the passages in front of the stalls. They project at right angles from the middle, with arched cartways for backing in the turnips and grass; and being uniform in height with the rest of the buildings, give to the whole a very elegant and artistical appearance. They are, however, rather small, especially the one on the west side, which also forms the entrance to the manure-yards. It takes a good deal of turnips to carry a hundred head of cattle through a storm—more than they will contain. At the same time, their position is good, enabling the cattle-man to feed and superintend his charge without opening an outside door. There is nothing which disturbs cattle more than the opening of outside doors, especially in stormy weather, or which retards in a greater degree the progress of fattening; and when we add to this frozen turnips in frosty weather, and dirty in rainy—a state of things still too frequent in this as in other quarters—the advantages here enjoyed appear the more invaluable. In the case before us, the cattle-man, after entering in the morning, has not to open an outside door, unless when going to his meals; while everything is so planned inside, that he can perform his day's work with the least amount of labour to himself and disturbance to stock. A door, for instance, opens into the straw-barn from the centre, so that straw for food and litter can be given to each lot of cattle without disturbing either them or the others. Turnips in the same manner. A door, again, enters from the stable, opposite the manure-yards, so that the stable manure can be wheeled the shortest way into them by the horse-men, in the morning, and spread over the yards by the cattle-man, when he spreads the manure from the stalls, thus mixing the two together. And how easily is all this work done, and how satisfactorily to both man and master, when compared with the open-yard system, where turnips have to be wheeled through the byres for the yard-cattle, and the straw carried through the yard-cattle for the stables and byres, keeping barn-doors, stable-doors, and byre-doors continually on the clatter, and cattle on the *qui vive*, the winter-day over! Those of our readers who are still subject to this latter plan can scarcely form an adequate idea, either of the advantages of the former, or disadvantages under which they themselves yet labour in the economy of food and labour, and the manufacture of manure, butchermeat, and dairy produce. The entrance to the yards, for the removal of stock and manure, is at the west turnip barn, as already stated, and consists of an inclined plane from the floor of the latter to the bottom of the former. Across the passages there are wooden gangways over this inclined plane, which are removed when carting out manure. There is also a plank, on which the turnips are wheeled from the west barn to the store cattle in the yards, so as not to disturb the stall-fed cattle by wheeling along the passages in front of them.

There is nothing worthy of particular mention about the stable. It runs transversely along the south end of the cattle department, the south wall of the latter forming its north wall. The horses stand with their heads to the south wall, and tails to the cattle department; and at each end of the passage behind them, there is a capacious door enabling one half of the teams to go out, and enter at the east, and the other half at the west, thus avoiding travelling behind each other as much as possible.

The "cart-sheds" front the west or east side of the other buildings. Each horseman has his own compartment, so that there is no confusion in yoking or unyoking. And over the whole is a capacious granary.

The farm-house, although not very recently built, is yet modern. Mr. Jolly is a wealthy bachelor; and all we shall add on this division of our subject is, that many an English woman could here spend £500 a-year, and make herself and husband extremely comfortable.

Into artificer's details we cannot enter, for the want of space. The new buildings recently erected, including the whole except the farm-house, are built of freestone, and covered with slate. They are strongly timbered, and cost the landlord £1,100, and the tenant some three or four hundred more for carriage. Total investment £1,500, exclusive of the farm-house. They were designed, we understand, by the agent on the estate, (Hallgreen), Mr. Dixon, Lawrencekirk, with the assistance of the tenant of course, and reflect great credit to both; for although the first erected in the district, yet were they to be rebuilt now, after several years' experience, very little alteration would be made. The liquid manure

system having since then come into vogue, a steam-engine would probably take the place of the water-wheel. The turnip barns might be made a little larger, and the roof of the cattle department a little higher for the summer feeding of large cattle; but upon the whole, they justly meet with the general approbation of both landlords and tenants, there being seldom a week during which they are not examined. On our arrival, two landlords were there, who had examined everything very minutely.

THE COLESEED CROP.

In the selection of a subject most suitable for the season I am often at a loss, and frequently know not what may prove of the greatest usefulness for the readers of my next paper; farm topics are so fully discussed everywhere, as to lead me to think myself rather presumptuous in writing article after article, as I do, for the columns of the *Mark Lane Express*, upon the many characteristics of farm management. I have been for thirty-five years a practical farmer on a somewhat extensive scale, and it is with pleasure that I give my own experience in farm cultivation and procedure, and hope, so long as my readers are content, to do so. But I should esteem it a favour if any one who honours my feeble papers by perusal would from time to time suggest any topic, or make inquiries, likely to lead to useful discussion on matters connected with practical agriculture. I shall be happy to take them up, to the best of my abilities, at all times; and it is owing to a wish expressed by some inquirer in the *Mark Lane Express* that I take up, or rather continue, one of the subjects, as named at the head of this paper; for I had already sent an article to the Editor before the inquiry was made. I have cultivated most of the common agricultural-seed crops, and consequently shall write from my own experience as well as observation.

THE COLESEED CROP.—In this paper my remarks will be confined to the management of the coleseed (rapeseed) crop, with a view to the *production of seed*. I have in former papers—on "Fallows," "Culture of Turnips," and the like—sufficiently set forth the order of cultivation for such crops; suffice it to say that the soil must be loamy and fertile, be well worked or highly pulverized, and it ought to be supplied with a good dressing of manure. Every attention must also be given to obtain a good and regular plant throughout the field. These matters being attended to, success will be the result.

THE GREEN CROP.—There are three principal methods pursued to provide a good plant for the general crop. The *first* is, to fallow the field in the usual way until about the second week in July, giving it the customary workings and manuring, and putting in the seed as for a food crop, for which, in fact, it is designed. It is fed off as late in the winter as circumstances will allow, and then "laid in" for a seed crop. If the season be propitious the "stumps" will put out new shoots freely. Deep hoeing should then immediately take place; to be repeated as often as required, followed by careful weeding. In this way, if the land is good or richly manured, a profitable seed crop may be obtained at little expense; and, at the same time, the green food has given sustenance to the flock in no inconsiderable quantity. There is undoubtedly much hazard in respect to this mode of securing a plant: frequently severe frosts destroy a very large proportion of the over-eaten stalks; consequently the field is sown to another crop. This is so commonly the case, that growers of seed seldom depend upon this mode of obtaining a plant; but the probabilities are so favourable either for a seed crop or a corn crop, that it is often tried.

The *second* mode to which I shall refer is this—it is, in fact, the only safe course to pursue, *i. e.*, to set apart the field entirely for the seed crop, and manage it accordingly. It is not desirable to secure a large well-grown plant; this is almost certain to meet with great injury from frosts or severe changeable weather in winter; or, if it should escape uninjured through that season, it may grow too luxuriantly in the spring, come too early into flower or bud, and then be cut off by late rime-frosts. These frosts prevent the setting of the flower to seed, and frequently cause them to fall off. The safest way is to arrange other matters of fallow-management so that the field for the coleseed crop is left until last. It should then be well and effectively done, the seed being carefully and thinly drilled in, so as to form a regular, but rather thin, plant throughout the field; failing this, it must be hoed and thinned. The plants should neither be too large nor too thick. Plants from six to ten inches high stand the winter best, and are sufficiently strong to branch out in the spring, and grow with force and vigour.

The *third* mode usually pursued is this: In some districts it is customary to sow rye, tares, trifolium, &c., in the autumn after wheat, for early food in the spring; in others to leave the two years' seeds for spring food, and plough them up late, *i. e.*, in June or July. In cases like these it is often sought to secure a coleseed crop. This is easily to be obtained, and ample time left for cleansing and fallowing the land. The mode of working and pulverizing I need not now describe; the main point is to get it well fallowed and sown by the middle of August, the seed to be drilled in with a good manure compound, to cause it to vegetate and grow rapidly, so as to attain some strength before winter. The old rule is that, if the leaf of the plant on good soils does not exceed the size of a half-crown, it will not become a profitable crop.

MANAGEMENT.—A plant being secured, and the soil in a fit state to produce a crop, nothing more need be done until spring. As soon as suitable weather sets in, a deep and effective hoeing should take place, and the plants should be thinned, so as to leave them at regular distances as much as possible, and from six to eight inches apart, according to the condition of the land and the size of the plants; the larger the plant the more room it will require. Careful weeding should also follow, as the value of the seed is much enhanced by its cleanliness, its uniformity in size, and dark bright colour, very closely allied to black. The crop will in average seasons be ripe about the middle of July, and is easily known by its change of colour from green to a light drab; the seeds in the pods will to a greater certainty indicate its ripeness, and as soon as they attain a degree of hardness, the crop may be harvested. It should be cut down as expeditiously as convenient, in order that its colour and uniformity may be retained; but the colour is often seriously injured by unnecessary exposure to unfavourable weather; repeated rains also cause it to grow whilst lying in reaps or sheaves. The common practice is to cut the crop as soon as ripe, and tie it into sheaves, leaving them lying abroad on the top of the stalks or stumps to dry. The sheaves are thus made: a few of the longer and more pliable stems within the reaper's reach are pulled up by the roots; these are laid along on the ground to form the band; the reaper cuts a sufficiency to make a sheaf of moderate size, which he lays upon the band; he then takes hold of both ends, pulls them together, twists the pod end once or twice round the root end, and tucks it in, leaving the root end sticking out rather awkwardly. Where reed, rushes, or long sedge abound, they are often resorted to for bands; straw is frequently used; but if the above plan "of tying with its own" is adopted, and is carefully practised, no great loss will arise; it is by far the readiest method of tying. If the weather is suitable, it will be ready to stack in a few days; care should be taken not to stack it in damp condition, but it is not quite so necessary to await the perfect state in which mustard or turnip seed should be stacked. The stacking or pieing should be effected in the same way as named for these crops, so that every sheaf, when laid, has a downward inclination, to discharge wet; the root ends require to lie wide apart to obtain this inclination. If well stacked and securely covered, it will keep safely for years; but the seed itself will of course degenerate, losing both its colour and its oily properties. It is very commonly thrashed from the field without stacking, and in exceedingly dry seasons it is a good plan, as the seed will keep well either in sack or granary, and much labour and cost is thereby saved. In damp seasons stacking is almost indispensable, and as the stack does not press so closely together as corn, it will gradually become dry. The thrashing is done on large sail-cloths, and generally by flails; the machines making so much cavings, prevent free dressing. The usual company comprises six thrashers, two sleds with two men and two lads, to fetch up the seed, two men to "lay on," two to shake off, one to take straw away &c., one to riddle the seed, and a woman and two lads to collect the seed and fill the riddle. The final dressing commonly takes place after the thrashing is finished, and is done by passing the seed through sieves with small meshes, about six or eight to the inch, to be either winnowed by a large revolving fan or a steady wind, this operation being repeated as often as required, and the tales carefully swept away, to be redressed, will eventually make a good marketable sample. The straw is very serviceable for litter, forming a capital bottom for the fold yard; it makes a first-rate steddle for a stack, and will stand for many years made into a stack or wall for shelter in bleak situations.

The seed is very saleable, and generally at a remunerating price to the grower. The yield will vary from sixteen bushels to fifty. It is used chiefly for crushing, and produces that valuable oil called "rape-oil;" the refuse, the highly-prized manure known as rape-cake. This cake is also used as food for cattle, &c.; it is not, however, greatly relished, on account of its peculiar flavour and hot or pungent character.

Much is said as to the injury this and similar crops do to the lands on which they are grown—that they yield no return of manure—fill the soil with seeds—and are exhausting crops. I can positively say that my experience goes far to contradict this theory. The succeeding corn crop is invariably a good one, except from accidental causes; and if farmers will burn the coleseed straw, and neglect to promote the vegetation of straggling seeds, they must expect some loss and trouble. I am firmly of opinion that on all good loamy soils an occasional crop of coleseed or turnipseed is a salutary and beneficial change in any rotation of crops.

SPRING FOOD FOR LIVE STOCK.

Providing food for live stock at this time of year, and particularly in a backward spring, is a point of considerable difficulty. How is the turnip-farmer to find keeping for his flock, when all his swedes ought to be cleared off for barley-sowing, and young clovers are not yet ready for stocking? Where a large proportion of grass-land is combined with arable, what are sheep to do which have finished their crop of roots, and yet find the pastures devoid of any bite? Well, the lucky occupier who has a water-meadow at command is free from such anxiety; and, in his case, at this season strong motives may be seen for extending the system of irrigation wherever possible, and even of watering by pumps and steam-engines in other cases. But let us note the various kinds of crop or of management by which farmers have been accustomed to meet the emergency.

One of the old-fashioned practices on grazing land is termed "*fogging*," though it has grown obsolete, except in some very backward provinces. In various parts of South Wales it is still customary to remove cattle from pastures in May or June, leaving the year's crop of grass untouched by stock or scythe till the following spring. In this way a store of early keep is obtained without the risk and expense of haymaking—seldom done well in that humid climate. *Rowen*, or kept aftermath, was formerly considered almost invaluable for spring feed, as on good land it keeps eight or ten ewes and lambs per acre throughout the month of April.

In a delayed spring-time, when the farmer has eked out his turnips and mangels with hay, chaff, and other provender—removing the remnant of his crop of swedes for consumption upon some convenient plot of ground, so as not to hinder barley-sowing—it is a common practice to run the flock thinly over the pastures and young clovers and seeds, or perhaps also upon a plot of early vetches. This is felt to be a compulsory, though disadvantageous, management; and the farmer knows all the time that in thus nipping off the first young shoots he is greatly damaging his herbage, and diminishing the summer supply.

Are there any forage plants, then, which will afford a bite earlier than the common pasture grasses, and which are worth cultivating simply for this purpose?

Burnet may be recommended on a *dry calcareous soil;* its natural habitat upon the chalk Downs of southern England pointing out this limited sphere of growth. The peculiarity of this plant is, that it will improve through the winter in spite of frost, and afford a fine pasturage in March and April, being in this point unrivalled by any other artificial grass. Much objection has been taken to burnet because cattle do not relish it when full-grown, and from the ill success of improper management. But it should be remembered that this plant, whatever its qualifications as a hay and seed crop, &c., being chiefly valuable for its extremely early spring pasturage, should be managed expressly to this end; therefore, it ought not to be fed down closely in autumn, but left from about October some six inches high. Sheep do enjoy it in its *young* state; particularly as they come upon it at a season when they are weary of half-frozen roots, and are longing for green herbage. A crop, however, capable of more general application, is *rye*, which has become of increased importance since autumn-tillage has given us greater facilities for winter cropping. Some readers may object that rye when young furnishes but little food, and that it shoots up rapidly into a harsh stalk, which stock do not relish. But it appears that all this may be overcome by growing *the right variety*. There is the St. John's Day Rye, introduced to public notice by Mr. Taunton, of Ashley, near Stockbridge: this plant, if sown at its proper time, and on any siliceous or light loamy soil suitable for it, and left uneaten in the autumn, is said to afford sheep-feed equal to good water-meadow, and this as early as the beginning of March. Mr. Baker, of Writtle, well known as a practical farmer of long standing in the county of Essex, has an excellent sort, which comes very early, but is mown for horses and cattle, instead of being fed off with sheep. Finding that as the stem advanced the stock would eat only the tenderest portions, he adopted the method found so economical in other cases, of cutting up the green rye into "chaff," mingled with an equal quantity of straw and hay. The principal points to be attended to in its cultivation are, that the land should be of a sandy or gravelly character, in order to insure its greatest perfection; the seed-bed must be very finely harrowed; and the rye sown shallow, in dry weather. The time for sowing is from the middle of September to early in October; the quantity three bushels. Well manuring with guano amazingly increases the crop. The first cutting in ordinary seasons is at the commencement of April; when injured by a heavy fall of snow and delayed by a dry spring, as in the present year, the produce is not available till the latter end of that month: but, whether late or not, it invariably comes in long before grass or any other herbage is ready.

In such a backward spring as the present, when the pastures are still bare, and winter tares threatening to be useless until Midsummer—when all our mangels are eaten up, in spite of being eked out with the hardy and invaluable cabbage, farmers will, no doubt, weigh with great concern the evidence in favour of extending such crops as we have referred to.

AYRSHIRE AGRICULTURAL ASSOCIATION.

THE COUNTY SHOW.

The Ayrshire Agricultural Association's Annual Show of Farm Stock took place in Ayr, on Tuesday, April 24, in the field opposite the cattle market. The following is a list of the prizes:—

CATTLE.

DAIRY STOCK.—AYRSHIRE BREED.

For the best bull, not under three years old, six sovereigns, with one sovereign additional if a pedigree of the prize animal be produced at the time of entry for not less than two generations back. The society's silver medal will be awarded to the breeder of this bull, if resident in Ayrshire—Andrew Macgregor, Ditton, Riccarton; for the second best ditto, four sovereigns, H. M. Cuninghame, Carskeoch, Straiton; for the third best ditto, two sovereigns, James Morton, Townhead of Drumley, Tarbolton.

For the best two-year-old bull, four sovereigns, with an additional sovereign for the pedigree, and the medal to the breeder, as above, John Parker, Nether Broomlands, Irvine; for the second best ditto, two sovereigns, H. M. Cuninghame, Carskeoch; for the third best ditto, one sovereign, George Gairdner, Kirklandholn, St. Quivox.

For the best bull stirk, two sovereigns, with an additional half-sovereign for the pedigree, as above, John Parker, Nether Broomlands, Irvine; for the second best ditto, one sovereign, Mr. Wilson, Oldmill, New Cumnock; for the third best ditto, one half-sovereign, Alex. Oswald, of Auchincruive.

For the best aged cow, either in calf or in milk on the day of exhibition, ten sovereigns, with an additional sovereign for the pedigree, and the medal to the breeder, as above, John Reid, Scouts, Tarbolton; for the second best ditto, four sovereigns, James Morton, Townhead of Drumley; for the third best ditto, two sovereigns, Mr. Ritchie, Broadwood, Coylton.

For the best lot of three cows, bred by the exhibitor, in calf or in milk on the day of exhibition, seven sovereigns, John Parker, Nether Broomlands; for the second best ditto, three sovereigns, Ivie Campbell, Dalgig, New Cumnock.

For the best three-year-old cow, in calf or in milk on the day of exhibition, six sovereigns, with an additional sovereign for the pedigree, and the medal to the breeder, as above, Hugh Rodger, Attiquin, Maybole; for the second best ditto, three sovereigns, Alex. Ritchie, Broadwood; for the third best ditto, one sovereign, Mr. Kirkwood, Shankston, Straiton.

For the best pair of two-year-old queys, not in calf, two sovereigns, and the silver medal, John Parker, Nether Broomlands; for the second best ditto, one sovereign, John Meikle, Brownhill, Tarbolton.

For the best pair of quey stirks, one sovereign, Alex. Oswald, of Auchincruive; for the second best ditto, one half-sovereign, Mr. Kirkwood, High Langmuir, Kilmaurs.

DAIRY STOCK.—SHORT-HORNED BREED.

For the best bull, not exceeding five years old, six sovereigns, James Wright, Girvan Mains, Girvan; for the second best ditto, three sovereigns, Adam Rankine, of Knockdon, Maybole.

For the best bull stirk, two sovereigns, Mr. Guthrie, Crossburn, Dundonald.

DAIRY STOCK.—GALLOWAY BREED.

For the best bull, not under two years old, three sovereigns, James Walker, Dyke, Straiton.

FAT STOCK.

For the best ox or heifer calved after 1st January, 1853, three sovereigns, Gavin Ralston, Dunduff, Maybole; for the second best ditto, one sovereign, Gavin Ralston, Dunduff.

For the best ox or heifer of any breed, pure or cross, not exceeding 3½ years old, showing most symmetry, weight, and fat, two sovereigns, Gavin Ralston, Dunduff.

For the best fat cow of any age, of the Ayrshire breed, two sovereigns, John Findlay, Lyonstone, Maybole.

HORSES.

For the best brood mare for agricultural purposes, having had a foal in the season of 1855, or being in foal at the time of the exhibition, five sovereigns, William Craig, Cunningham Baidland, Dalry; for the second best ditto, three sovereigns, John Houldsworth, Burnfoot, Dalmellington; for the third best ditto, two sovereigns, Robert Paton, Highlees, Dundonald.

For the best brood mare for agricultural purposes, having along with her two of her produce, three sovereigns, Robert Hutcheson, Craigsland, Dundonald; for the second best ditto, two sovereigns, Alexander Anderson, Glenside, Kirkmichael.

For the best gelding or mare, for agricultural purposes, four years old and upwards, three sovereigns, Robert Hutcheson, Craigsland, Dundonald; for the second best ditto, two sovereigns, James Kennedy, Myremill; for the third best ditto, one sovereign, Thomas Maccrorie, Whitefaulds, Maybole.

For the best three-year-old ditto, three sovereigns, Wm. Stevenson, of Balgray, Beith; for the second best ditto, one sovereign, James Kennedy, Myremill; for the third best ditto, one half-sovereign, David Kerr, Haining, Largs.

For the best gelding or filly, for agricultural purposes, foaled after 1st January, 1853, two sovereigns, Alex. Anderson, Glenside; for the second best ditto, one sovereign, John M'Creath, Barskelly, Kirkmichael.

For the best colt, foaled after 1st January, 1854, one sovereign, James Miller, Burnbank, Craigie; for the second best ditto, one half-sovereign, Matthew Hamilton, Newfieldmains, Dundonald.

For the best filly, foaled after 1st January, 1854, one sovereign, Alex. Anderson, Glenside; for the second best ditto, one half-sovereign, Hugh Taylor, Bullhill, Galston.

For the best pair of agricultural horses, two sovereigns, Hugh Wyllie, Overmills, Ayr; for the second best ditto, one sovereign, James Kennedy, Myremill.

For the best entire colt, foaled after 1st January, 1853, five sovereigns, Matthew Young, Knockindale, Symington.

SHEEP.

BLACK-FACED BREED.

For the best two aged tups, selected from a sheep stock of not less than eighty, two sovereigns, Samuel Kilpatrick, Barnhill, Coylton; for the second best two ditto, one sovereign, John Craig, Craigdarroch, New Cumnock.

For the best two-year-old tups, selected as above, two sovereigns, Mr. Young, Balrasie, Ballantrae; for the second best ditto, one sovereign, John Craig, of Craigdarroch.

For the best three tup hogs, selected as above, two sovereigns, John Craig, of Craigdarroch; for the second best three ditto, one sovereign, John Hyslop, of Blackcraig, New Cumnock.

For the best pen of three ewe hogs, selected as above, two sovereigns, Captain Kennedy, of Bennane, Ballantrae; for the second best ditto, one sovereign, Samuel Kilpatrick, Barnhill, Coylton.

LEICESTER BREED.

For the best tup, two years old and upwards, three sovereigns, John Rankine, of Beoch, Maybole; for the second best ditto, one sovereign and a-half, John Rankine, of Beoch.

For the best ditto, under two years old, two sovereigns, John Rankine, of Beoch; for the second best ditto, one sovereign, Alexander Oswald, of Auchincruive.

For the best two ewes, not exceeding five years old, with their lambs, three sovereigns, John Rankine, of Beoch; for the second best ditto, one sovereign, Robert Inglis, Stair House, Stair.

SOUTHDOWN SHEEP.

For the best tup, two sovereigns, John Rankine, of Beoch, Maybole; for the second best ditto, one sovereign, James Campbell, of Craigie.

For the best two ewes, not exceeding five years old, with their lambs, two sovereigns, Capt. Tait, of Milrig, Galston; for the second best ditto, one sovereign, James Campbell, of Craigie.

CROSSES.

For the best pen of three wedder or ewe hogs, a cross betwixt the Cheviot and Leicester, one sovereign, Gavin Ralston, Dunduff; for the second best ditto, one half sovereign, Gavin Ralston, Dunduff.

For the best pen of three wedder or ewe hogs, a cross betwixt the blackfaced and Leicester, one sovereign, John Rankine, of Beoch; for the second best ditto, one half sovereign, John Cunningham, Trees.

For the best pen of three wedder or ewe hogs, a cross betwixt the blackfaced and Southdown, one sovereign, James Campbell, of Craigie.

PIGS.

For the best boar, of any large breed, five sovereigns, James Morton, Townhead of Drumley; for the second best ditto, two sovereigns, John Taylor Gordon, of Blackhouse, St. Quivox.

For the best boar, of any small breed, five sovereigns, Wm. Calderwood, Parclewan Mill, Dalrymple; for the second best ditto, two sovereigns, James Todd, Dunure Mains, Maybole.

For the best breeding sow, of any large breed, having reared a litter within two months of the day of exhibition, or being in milk on that day, three sovereigns, Wm. Hay, Tarbolton.

For the best ditto, of any small breed, three sovereigns, Robert Drummond, Bogwood, Mauchline.

JUDGES:

AYRSHIRE DAIRY STOCK.—Mr. Baird, Lochwood, by Coatbridge; Mr. Paton, of Cloberhill, East Kilpatrick; Mr. Buchanan, Gascaddin Mains, New Kilpatrick; Mr. Lorimer, Kirklands, Kirkconnell.

HORSES.—Mr. Forrest, of Treesbanks, Allanton, by Hamilton; Mr. J. Foster King, West Longhaugh, Bishopton, Glasgow; Mr. Wilson, Frithfield, by Anstruther, Fife.

GALLOWAY STOCK, BLACKFACED AND CHEVIOT SHEEP.—Mr. M'Millan, Glencrosh, Minnyhive, by Dumfries; Mr. M'Call, Caitloch, by Dumfries; Mr. Kennedy, of Dalmakerran, by Thornhill.

SHORT-HORNED CATTLE; LEICESTER, SOUTHDOWN, AND CROSS-BRED SHEEP, AND PIGS.—Mr. Watson, jun., Keillor, Meigle; Mr. Simson, Blainslie, by Lauder; Mr. Laurie, Tregglestone, Dumfries.

FAT STOCK.—Mr. Paton, Flesher, Largs; Mr. Rodger, Penkiln, Garlieston, Newton Stewart.

POULTRY.—Mr. Little, 5, Dixon-street, Glasgow; Dr. Steven, Ardrossan; Mr. Donald, Johnstone.

EXTRA STOCK.—Mr. Sidey, Pitcairn Green, Perth; Mr. Young, Engineer, Ayr; Mr. Ralston, Lagg, Ayr.

STRAW-CHAFF AS FOOD FOR STOCK.

DEAR SIR,—Will you oblige me with a small space in your columns to reply to the many inquiries addressed to me on the subject of steamed or scalded straw-chaff as food for sheep and cattle, which I propounded through your pages? as, by this mode of reply, I shall not only reach those who have immediately addressed me by letter, but probably others also, who may wish for further information in the matter; and I trust that those gentlemen who have addressed their inquiries to me immediately, will find in this communication an answer to those points on which they require fuller information, or such further directions for carrying out my system as their several circumstances will permit them to avail themselves of. First, then, I say—it is not absolutely necessary that the parties adopting my system should have a steam engine upon the premises: it is true I prefer steam as a means of cooking the chaff, but boiling-water is a very good substitute where steam cannot be had, or even cold water will do; only with this latter you must adopt the system of spontaneous fermentation, which has, however, this disadvantage—that the process is longer in hand, and, further, requires a larger expenditure of the minced roots, which in a season like this is a serious consideration, as it requires about one-third of the bulk to be minced roots, in order to set up spontaneous fermentation.

But whatever mode you adopt of cooking the chaff, the best receptacles for the purpose will be brick cisterns or tanks, which, of course, may vary in size, according to the quantity of food required for consumption. A good size for these cisterns is six feet square, inside measure, by three feet six inches in depth, or six feet by nine feet. If very large quantities of food are required, they must have a perforated false bottom, either of wood or iron, and there should be a wooden plug through the outer wall, inserted between the true and the false bottom, to let out superfluous moisture, or in case of spontaneous fermentation being adopted, to let in atmospheric air, which is highly essential to its production. The outside walls of the cisterns should be nine inches in thickness, and the partition walls four and a-half inches. There should also be an oak kerb on the top of the walls, and lids to cover down the cisterns securely, so that there may be no unnecessary waste of steam. From two to four cisterns will be sufficient on most farms. I, however, make use of five such; and intend erecting two more.

Where there is not a steam engine upon the farm, one of the ordinary steam generators for cooking vegetables would be found useful, and might be had at a moderate price, with which the cisterns might be heated.

In mixing your minced roots with the straw-chaff, do it when removing it from the cisterns: the roots do not require steaming. And as to the best mode of preparing the roots for mixing, by mincing or pulping, I am not aware that there is any better machine for the purpose than the Royal Agriculcultural Society's prise machine, made by Woods of Stowmarket, Suffolk; who also makes a larger machine, applicable to steam or other power, which will mince from two to four, or even more bushels per minute.

I am, yours, &c.,

FREDERICK PHILLIPS.

The Hall Farm, near Brandon.

LEASE ROUTINE.

In a former article we adverted to the discrepancy that exists in farm leases, under the altered position of tenants; for notwithstanding the improved system of cultivation, the introduction of guano and artificial manures, the facility of transport by railways, improvement of implement and farm buildings, we still adhere to the old forms of leases, that have been in existence for centuries, and to preserve their covenants intact. Although the period and circumstances under which they were framed have long passed away, or been consigned to the "tomb of the Capulets," there are still the old covenants stipulating for naked fallows, for the not growing pernicious seeds and roots—of which potatoes are named as the chief—and for the manner in which the arable lands shall be cultivated and cropped; the exact rotation pointed out, and enormous fines, by way of increased rent, imposed for each infringement.

Well, the lease is no sooner signed, sealed, and delivered, and the tenant has paid his twenty guineas, than he becomes possessed of the precious document, which in many cases he never afterwards opens until some quarrel with the landlord or agent has taken place, or the expiration of the term approaches, when, to his astonishment, he finds himself subjected to fines and penalties without number, which he had never contemplated, and which, if inflicted, would ruin him, but which so far renders him subservient to the agent as to become twisted and moulded to any purpose or form of action in the event of his quitting the occupation.

It may be urged that having entered into the contract he is bound to fulfil it. This it is not our intention to deny; but we have no hesitation, on the other hand, in stating that it is unjust to impose penalties of a ruinous tendency for small *laches* of management, and which probably have not been attended with any detrimental consequences to the farm; and the better to elucidate our point, we will give in detail certain alleged breaches of covenant upon a farm, situated in one of the home counties, upon which an action was commenced, and which was referred from the court to arbitration, and in which the costs and award exceeded six hundred pounds:—

One of the covenants of lease was that the tenant should "make one-fourth of the arable land *one clean whole summer's fallow*, under payment of ten pounds per acre as increased rent for each and every acre farmed contrary to the covenant during the remainder of the lease, except upon one-fourth part upon which tares might be grown: the penalty of ten pounds per acre for every acre sown with grain or white-straw crops in succession, also as increased rent; and for every acre of tares seeded upon the fallow land: the like payment for clover mown twice, or for any quantity beyond a moiety thereof mown once, &c., &c. The sum sued for amounted to upwards of £1,200; for which the award was settled at about £75, and, with the costs, altogether amounted to about £630.

In one instance the tenant had sown 5½ acres of oats in the succeeding year after wheat; he had on another occasion seeded 2½ acres of tares upon the portion of land appropriated as fallow; and upon the remainder of the fallow land he had yearly taken Swede turnips, mangold wurzel and coleseed, the whole of which had been consumed by his stock upon the farm; and although the witnesses proved that he had during his occupation improved the farm, and the umpire of the arbitrators took a very favourable view of the case notwithstanding, the very heavy sum as before stated was inflicted, and paid by him.

Since it has been discovered by lawyers that penalties for breaches of covenant cannot be recovered, the infliction has been rendered doubly severe by imposing a heavy fine by way of increased rent during the whole of the remainder of the term; and it is only, as in the case referred to, when it is too late to retrace the steps he has taken, probably in entire ignorance, that the tenant finds this ruinous infliction overtakes him. And, unfortunately, the case mentioned is not a solitary instance; for we happen to know others equally severe, that took place upon the sale of estates where the purchaser (a solicitor), desirous of becoming possessed of the farms, sued the whole of the tenants, and succeeded in either driving them into submission or expelled them altogether.

Another instance has also come under our notice, where a tenant, having covenanted to *uphold and maintain* the premises in *sufficient, good, and tenantable repair*, rendered himself liable to restore them in the event of fire occurring, and was therefore compelled to insure them at his own expense, or remain liable to such risk during his term; and in that, as in numerous other instances wherein the tenant imagined that he was only liable to mere tenantable repairs, by the introduction of the words in addition before named, at last has found himself called upon to put the premises into a state almost equal in amount to substantial repair.

If leases were rendered in plain unmistakable language, clearly expressing how far the tenant was liable, and also defining the extent of his liability as regards repairs, we would not utter a syllable of objection against them; but we know that such instruments are prepared frequently with no other object but to hold him responsible; in coaching phrase—" to keep him well in hand, whenever he may feel disposed to kick over his trace."

For our own part, we half incline to the opinion that a money payment for a moiety of the rent, and the other half to be dependent upon the price of grain or meat, as circumstances may dictate, would be best; that the landlord should undertake all the repairs himself, and charge the tenant half the labour only or not, as may be agreed upon; that upon the tenant manuring the land with guano or other purchased manure, to the value of 3 cwt. of guano upon each statute acre, that he should be allowed to take, upon every acre so manured, grain crops in succession, or potatoes or other fodder crops, to be sold off the farm.

It was not our intention to enter so fully into detail, when we commenced this article, but we have felt it our duty to hold up the injurious system that has been introduced into recently drawn leases, whereby tenants are unconsciously drawn into covenants that may be turned against them with ruinous effect; and we are assured that most landlords would feel equally well satisfied if such covenants were framed so as to prevent injury to their farms, merely giving them power by *arbitration* to recover of the tenant compensation for any injury they might sustain. Tenants unaccustomed to the nature of leases ought never to commit themselves by signing them, until previously examined by some legal or other competent person to advise them; and with that view, we have undertaken, without prejudice to any one, to point out the necessity of landlords and tenants adopting leases that are drawn fairly and beneficially for both parties, and not those one-sided instruments that may be turned into a scourge more dreadful than the *knout* itself, whenever an opportunity occurs to enable it to be done. Again we enforce, that " property has its duties as well as its rights;" and in doing so would call the attention of our readers to what we are enabled to quote from late meetings of the Botley and Croydon Farmers' Clubs.

AGRICULTURAL LEASES.

BOTLEY FARMERS' CLUBS.—At the last meeting of this Club the present form of agricultural leases came on for consideration, when the following series of resolutions were ultimately agreed to :

1st. That it is the opinion of this Club that the numerous restrictions which at present so frequently encumber the leases of farms are absurd and injurious, and should therefore be abolished.

2nd. That the tenant should have the power of farming in any manner he may think proper, provided he farms the land during the last two years in such manner as may be specified ; and,

3rd. That he should be compensated for unexhausted manures and improvements, according to a scale laid down and agreed upon.

4th. That the landlord should have the power of dispossessing a tenant for bad cultivation by a more summary process than at present exists, such power to be afforded by an Act of Parliament, and to be exercised only under the sanction of competent valuers, such having been previously agreed to by both landlord and tenant.

5th. That in the opinion of this Club the best term for a lease would be 21 years, determinable at the end of 14 years by a two-years' notice, given by either landlord or tenant.

The advantages of an equitable tenant-right were maintained by most of the practical farmers present, and the principle, it will be observed, embodied in the resolutions, adopted.

CROYDON FARMERS' CLUB.—At the anniversary dinner of this Club, on Saturday week, the Chairman, Mr. Page, also referred to the subject of Agricultural Leases. He said, " Now, as they had had enough formal speech-making, they would have little talk about agricultural matters; and he would start it with a subject which he had before mooted—that of agricultural leases. The present long and complex forms of leases were very prejudicial. He should like to see a general simple form of leases, and should be happy to start a subscription in order to pay some legal gentleman to prepare one. Lord Cottenham's steward had told him that in the three counties they had only one form of lease; but the London lawyers who prepared the leases in this part of the country knew nothing about them, except making them stretch over as many sheets as possible."

HIGH PRICES.

It is not for us to impress upon the agriculturist the good policy of his making the most of his means and opportunities. Fortunately, it is not necessary; and if it was, he has crowds of friends looking on, who are ever ready to so favour him. There was a period, certainly, when many a man hesitated ere he increased his outlay, or did all he was equal to. The return promised at best to be but uncertain, and the speculation consequently such as few prudent men would feel justified in standing seriously committed to. These times, however, have passed away; and, with more certain repayment for their investment, have we seen a gradual extension of those appliances which tend to the proper cultivation of the soil.

Just at this present moment, however, the making the most of his business is not only a duty the farmer owes to himself, but to his country. The more he can produce, the more will be the benefit to himself and his fellow-man. Truism as we have long been told to regard this, it was never so much so as at this time. An ungenial spring, sending in upon us but indifferent reports from almost every part of the kingdom, points to a late and by no means an encouraging harvest prospect. A war, that now again threatens to be determined only by the slow reasoning of merely physical force, calls, on the other hand, for all which, out of an abundance even, we might be enabled to supply. With the return of Lord John Russell, we have a significant and very marked rise in market prices. Under ordinary circumstances, the very season itself would in some measure have led to this; while we fear the two combined, promise to make such high rates but the standard for some time to come.

We should trust the agriculturists here at home are quite alive to this. If they are not, we can assure them other countries are. We give following this, an article on "High Prices," from an American paper—the "New England Farmer"—the whole point of which, it will be seen, is to prepare its readers for that good market which a variety of circumstances, it is argued, must await what produce they have to offer. The exigencies of war, the more voluntary emigration of our people, and the regular influx of gold consequent on this continued exodus, are all used, fairly enough, to support such a view. The deduction is manifest enough :—"It becomes the farmer, then, to make his plans so as to have little to buy, and to make his products large, even at an unusual expense. We are no advocates for lavish expenditures, but we believe that the farmer may safely employ more labour than usual this season, and may judiciously expend for manure, both of the stable and for guano and superphosphate of lime, and plaster ashes, more freely than heretofore. He may feel assured that his own labour, skilfully applied to his farm, will be, this season, liberally rewarded."

Like ourselves, although not arising from a combination of *two* grand causes, parts of America would appear to be in expectation of some scarcity of labour. The other means, however, at their command, are more assuredly so at our own. We, too, are no advocates for lavish or useless expenditure, but if more capital can be employed, never, certainly, was there any such occasion for warranting its use. If the tardiness of the spring can be corrected by the larger application of manure, he will be a wise man who does not neglect such an alternative. If more labour, either manual or mechanical, will forward our operations, and make us in some degree armed against an adverse season, we have at least of one kind a very plentiful supply. There is no excuse, in fact, for any man, not doing all he can; and there is no man's business that will be watched so anxiously as that of the farmer. "Under these circumstances," wrote the *Times* the other day, when considering the state of the money market, "the harvest is the most important subject of consideration." Under almost any circumstances we the rather take it to be so. There may be now some further facilities for the importation of corn from other countries, but in times like these the people are more than ever inclined to ascertain how far they can depend upon their own resources. The position the agriculturist now occupies is deservedly a high one, and he cannot exert himself too much in meeting the demands that will be made upon him.

Our contemporary declares, in the article we have already referred to, "that no opinion can yet be formed on our harvest prospects." At any rate experience does not justify us in forming too favourable a one. The grand requisites at this important season, the proverbial alternation of rain and sun, are still denied us. We have, in a word, no "growing weather;" and without this, harvest prospects cannot be regarded as very encouraging.

We feel it only a matter of duty to speak thus plainly, and to show the farmers of this kingdom how much remains with them. They have every incentive to exercise to the highest that skill and energy which they are at length admitted to possess, and that now more than ever may be used to our common advantage. As Mr. Bright said in the house on Tuesday, "the fact of the markets having gone up from five to seven shillings a quarter is an ominous sign," that should not be without its effect.

Within the memory of every grown-up man, eighty dollars was considered a high price for a horse that now sells at two hundred, and sixty dollars would buy a likely yoke of six and a-half foot oxen, which will now bring a hundred and twenty. A good cow which used to be thought dear at twenty-five dollars, now cannot be bought for less than fifty, and so through all the prices of live stock. Again, the prices current, at retail, in all the principal towns of New England, show that butter is worth thirty cents a pound, beef from ten to fifteen, potatoes a dollar a bushel, hay about twenty dollars the ton, and the rest of our products in proportion. These prices are nearly double those of the average prices of the last thirty years, though we are not forgetful of the high prices of 1836 and 7, which, by the way, are readily accounted for, by the general inflation of the paper currency and credit system, and the speculating mania of those times.

It concerns the farmers, now, to inquire a little into the causes of the present extraordinary selling value of commodities, with a view to deciding, if possible, what course is best for him to pursue, in the production of them, for the market. If such prices are to continue, he may well consider whether he may not take such advantage of them as to turn his labour and his land to better than usual account. We can afford to expend two dollars a ton, beyond our usual amount, to produce our crop of hay, when it may be sold at six or eight above its common price; and we may hire a little more help in the dairy profitably, when butter is worth thirty cents a pound.

What causes the present high prices? We will not pretend that we can answer this question with entire satisfaction to ourselves; yet there are facts, within the knowledge of all which, no doubt, tend to produce this state of affairs. The war in Europe may be named as one of them. Eighty thousand men, it is said, have already perished on the side of England and France, before Sebastopol. Add to this number those who have been enrolled in the armies of the allies above the number of the regular standing armies of those nations, and those who are indirectly turned from their accustomed pursuits, to convey troops, carry provisions, attend the sick, and the like, and we have probably a hundred thousand men, in England and France alone, withdrawn from the business of cultivating the earth.

Add to those an equal number, engaged in the service of Russia, and the vast increase of the armies of Austria, and of most of the European powers, who watch, with drawn swords, in preparation for battle, the issue of the pending contest, uncertain when they may be called on to engage in it, and it would not perhaps be an over-estimate to say that a quarter of a million of men are, at the present time, called away from labouring on the earth by the pending war!

Again, emigration from Great Britain, and especially from Ireland, has materially lessened the productive force of that nation. Much of this labour has gone to Australia, where it is employed in digging gold, and in the preparation for a new mode of life. Emigration to Kansas and the West generally, has, in some localities in New England, been so extensive as to lessen the value of farms thus deserted, and the labour of those emigrants, thus interrupted, cannot for some years be applied to the soil so as to return to the markets its former amount of products. The unusual influx of gold into this country and Europe, has doubtless an effect to produce an *apparent* increase of prices. We say apparent, because an influx of gold, like an inflation of the paper currency, adds nothing to the real value of property. Its effect is merely to make money less valuable, so that more of it is given for articles of real value, as the products of the earth and of the arts. So far as this cause has operated to raise prices, we can apprehend no sudden change, for the production of gold seems to be already a regular business, as uniform in its results as other pursuits, and will probably so continue.

There seems to us no immediate prospect of peace among the nations. The labour which should go to feed the hungry and clothe the naked is desecrated in mutual destruction, and another harvest, at least, must be gathered, before the poor survivors of the battle-fields find their way to their native lands, to renew their accustomed employment; and many years will pass, before the effect of this awful violation of the beautiful system of Providence, which gives bread for labour, will cease, and the regular laws of demand and supply be again established.

We believe that the products of the earth must continue to bear a high price, at least through another winter. It becomes the farmer, then, to make his plans, so as to have little to buy, and to make his products large, even at an unusual expense.

We are no advocates for lavish expenditures, but we believe that the farmer may safely employ more labour than usual this season, and may judiciously expend for manure, both of the stable and for guano and superphosphate of lime, and plaster and ashes, more freely than heretofore. He may feel assured that his own labour, skilfully applied to his farm, will be, this season, liberally rewarded.

Let not the farmer be behind other men in watching the signs of the times, and let him make up, by foresight and skill and energy, what he lacks in the natural fertility of a New England soil.—*New England Farmer.*

WELL-AIRED BEDS.—Housekeepers are highly censurable for not keeping their beds well aired, dry, and ready at all times for use. Many are the deaths that have resulted from the improper use of damp beds, to say nothing of colds, asthmas, bronchitis, &c., &c., and their attendant evils. Too much care cannot be given to this department of household management. When a stranger or friend is about to visit many families, what a process of airing one sees going on with bed and bedding! all right enough in its place, but generally such hasty dryings are not always effectual, for spare rooms and spare beds are proverbially damp, and not easily dried. An old housekeeper suggests the following very simple remedy, and unfailing:—Fill a stone bottle holding from one to three gallons with boiling water, securing the cork by tying it down safely with several thicknesses of stout linen, to prevent either moisture or steam from escaping; place it in an upright position upon the mattress, surrounded by bolster and pillows, and over these place the bed with the feathers, as far as possible immediately around the bottle, leaving it uncovered to allow the dampness to pass off. The bottle will keep in great warmth forty-eight hours in severe weather, and need not be replenished except under especial cases.

SALE OF MR. J. S. TANQUERAY'S HERD OF SHORTHORNS, AT HENDON,

ON TUESDAY, APRIL 24TH,

BY MR. STRAFFORD, OF EUSTON SQUARE.

Almost every succeeding week has its own peculiar event and attraction. In one, we have the fleet to sail from Spithead; in another, to welcome our illustrious visitors; in a third, there is the opening of the Royal Academy; while the fourth has a Derby to be run for, a new opera to be tested, or something equally exciting or important as the prominent feature for the time being. Sailors, courtiers, sportsmen, and artists, each in turn, become the heroes of the occasion, although the public generally have still quite sufficient interest in what is going on, to give such celebrations something more of a character than merely class or close meetings.

One of the "events" if not of the week, of the month past, at least as far as the agriculturist is concerned, has been the short-horn sale at Hendon. We should be inclined to rank even this, too, as something beyond a class gathering; for we saw many a visitor here duly armed with pencil and catalogue, who must have had very innocent intentions as to bidding up for high-bred cattle. The vicinity of the place of sale to the metropolis, the fineness of the day and the known hospitality of the owner of the stock, may have so accounted for the presence of many. There were others, however, who came from far greater distances, and with certainly some far more useful object in view. Of course we would not rank even a tithe of these either as actual or intended buyers. They came the rather to judge for themselves of what some had only previously heard—the almost fabulous prices given for shorthorn stock.

There has been a very prevalent notion for some time past that Mr. Tanqueray's sale would be a good one. Like the late Lord Ducie, he has been distinguished as a very spirited buyer, and, like that lamented nobleman, he has almost invariably gone for the best blood. To either has Mr. Bates been the great authority, and Kirkleavington the nursery from which they derived their chief treasures. Mr. Tanqueray may, indeed, be said to have in some measure followed Lord Ducie, having been one of the freest buyers at Tortworth. The Oxford 11th cow, for 250 guineas; Oxford 16th, when a calf, for 180 gs.; Mystery, for 200 gs.; Duchess 69th for 400 gs., and so on. Some of these came again to the hammer on Tuesday, and, it will be seen from the list of prices which we give in another column, at a very tolerable return for the risk and outlay incurred.

This list is well worth some attention. We have so arranged it, in defiance to the number on the catalogue, that our readers may come at once to the highly priced ones. Oxford the 11th, from the Tortworth herd, heads the cows at the extraordinary but not unprecedented price of 500 guineas. We ourselves saw Duchess 66th run the glass down at Tortworth for 700 guineas, and Duchess 64th, at the same sale, for 600, both to go to America. The purchaser here at Hendon was Mr. Gunter, a young breeder and a young man, who farms, or rather, we believe we should say, grazes some land at Brompton. He became first known at Lord Ducie's sale, where he secured some lots at very strong prices. The same gentleman, it will be observed, bought the Sixth Duke of Oxford, the second best bull, for 200 guineas, while he would have gone on for the Duke of Cambridge. He drew it, however, a little too fine, and the glass was out before his bid reached the auctioneer. This was the only dispute during the day, and we must say we think Mr. Strafford was quite right in not putting up the bull again. If the glass is to be the test, and we know no fairer one, it will never do to disregard its authority.

Against Mr. Gunter a glance round the ring showed us many of the best judges and most renowned breeders in the kingdom. They came, in fact, from all quarters—Yorkshire, Lincolnshire, Gloucester, Wilts, those strongholds of the shorthorn—the Booths and Torrs, Strattons and Sainsburys, with Jonas Webb from Cambridge, Barthropp from Suffolk, Cruikshank from Scotland; the Fields, Halls, and Simpsons, from nearer town; and hosts of others whose names are associated with this kind of stock. Still scarcely one of these could be put in antagonism with Mr. Gunter. Those who did buy, as Mr. Barthropp at a hundred and Mr. Webb at sixty, were content with good animals at fair prices. The "rage" or "fashion" was almost entirely confined to the gentleman already mentioned, and to visitors from America and Australia. We believe the high biddings were chiefly, if not solely, with these few. The second-priced cow at 480 gs., the 200 gs. one, the 180 gs. one, the 160 gs. one, and another at 140 gs., all go to America; while Barrington, one of the 200 gs. bulls, is destined for Australia, the other being secured by Mr. Gunter. Amongst the old recognised breeders, Sir Charles Knightley appears as the only one going to anything like an extraordinary price; and even he, but for a mistake, would most probably have been tired out.

We confess it is rather difficult to make a deduction here. Is five hundred guineas, for a very well bred and very good looking cow, an artificial or a warrantable price? If Mr. Tanqueray can double the value of an animal in less than two years, as he has done in this case, the answer would seem self-evident enough. His sale, however, considering the pains and cost at which he collected his herd, is not for an average a very extraordinary one. Some of the first cows put up went at mere butchers' prices; while against these we have certain strains that only appear to increase in estimation every time they are offered. The question arises here, is this said esteem or fashion to be justified? We are inclined to believe it is, and that its value will always be recognized as long as it can be traced. Nevertheless, few even of our best men, it seems, care to run up to anything like the lengths now attained. It is the export market, after all, that "makes" these wonderful sales. It was so at Tortworth; and but for this at Hendon, too, Mr. Gunter would have had it all his own way. One secret of this, however, at least with our American friends, is that they buy in companies—a plan which in the end materially reduces the cost at which a district obtains the use of our best stock.

Admitting, as every one did, how admirably the herd at Hendon is managed, how well and economically the buildings are arranged, and in what good and useful condition the stock were brought into the ring, it is a matter of some regret, if not of surprise, that this wholesale break-up should have been determined on. The responsibility, however, of still further preserving for us here at home some of the renowned Oxfords and Duchesses would seem to be now transferred to Mr. Gunter, who certainly enters on the duty with all the spirit of a man determined to have the best, and to do the best by it. We very sincerely wish him success. Even supposing it is a ' hobby," as some no doubt will consider it, he might indulge in many a worse one. The pursuit of this can hardly fail to result in some good.

We must not omit a word for the very excellent and methodical system on which the whole business of the day was conducted. As far as good generalship and hospitality could insure one, it was a very pleasant gathering; and, as we trust, not an unprofitable one to any of us.

COWS AND HEIFERS.

NAME.	WHEN CALVED.	BUYER.	PRICE. Gs.
Oxford 11th	1849	Mr. Gunter	500
Oxford 16th	1853	Becar & Morris	480
Hope	1850	Mr. Spencer	200
Minerva 2nd	1850	Becar & Morris	180
Lady Barrington 8th	1846	Lord Burlington	170
Victoria 26th	1853	Becar & Morris	160
Hopeful	1854	Mr. Spencer	140
Minerva 4th	1853	Becar & Morris	140
Minstrel	1846	Lord Burlington	110
Janetta	1848	Mr. Ambler	105
Lady Bates	1854	Mr. Combe	105
Lady Blanch	1850	Mr. Barthropp	100
Silence	1850	Mr. Barthropp	94
Iris	1850	Becar & Morris	90
Oak Leaf	1854	Lord Feversham	81
Surprise	1854	Becar & Morris	80
Jardine	1850	Mr. Stanhope	80
Narcissus	1851	Prince Albert	72
Oakapple	1847	Mr. Simpson	71
Daphne Gwynn	1845	Mr. Townshend	70
Jewel	1854	Mr. Hook	70
Olive Leaf	1846	Mr. Blaythwaite	66
Mary	1849	Mr. Calvin	65
Angela 2nd	1849	Mr. Topham	65
Delia	1854	Becar & Morris	65
Fancy	1851	Mr. Fisher	63
Oak Bud	1854	Mr. Grenfell	61
Sprightly	1854	Mr. Crawley	60
Daffy Gwynn	1851	Mr. Jonas Webb	60
Hyacinth	1849	Mr. Marjoribanks	58
Dolly Gwynn	1851	Mr. Fisher	56
New Year's Day	1847	Mr. Blaythwaite	55
Jenny Lind	1847	Mr. Cartwright	55
Boquet	1851	Mr. Stanhope	55
Julietta 6th	1853	Mr. Carrington	53
Honesty	1854	Mr. Guest	53
Camilla	1853	Brooks & Fuller	52
Minna	1844	Mr. Townshend	52
Fanciful	1854	Lord Feversham	51
Garland	1853	Mr. Stanhope	51
Arabella 3rd	1851	Mr. Walters	51
Cynosure	1851	Mr. Combe	50
Dorcas	1850	Mr. Kirkham	50
Olive Branch	1852	Mr. Angar	47
Carmine	1851	Mr. Abbott	47
Sympathy	1852	Mr. Cruickshank	46
Surmise	1854	Mr. Sartoris	45
Dorinda	1853	Brooks & Fuller	45
Lady-Emma	1848	Mr. Slatter	45
Duchess 2nd	1848	Mr. Walters	45
Delia Gwynn	1844	Mr. Blaythwaite	42
Astræa	1852	Mr. Jonas Webb	42
Dorothea	1852	Mr. Field	42
Statira	1854	Mr. Sartoris	40
Alice	1854	Mr. Hallett	40
Magic	1853	Mr. Ambler	40
Noisette	1852	Mr Lawford	40
Blushet	1852	Mr. Kirkham	40
Trinket	1850	Mr. Fisher	40
Cleopatra	1850	Lord Burlington	40
Fidelis	1848	Mr. Field	40
Mystery	1852	Mr. Drake	38
Wildair	1853	Mr. Atherton	38
Junia	1855	Mr. Cartwright	36
Joan	1847	Mr. Cartwright	36
Stately	1852	Mr. Woodward	35
Clematis	1852	Mr. Hook	35
Ann Gwynn	1851	Mr. Dormer	35
Louise	1854	Becar & Morris	34
Lady Bell	1854	Mr. Sartoris	31
Nerissa	1854	Mr. Robinson	31
Duchess of Cornwall	1844	Mr. Pinder	31
Rosamond	1854	Mr. Simpkins	30
Darling	1854	Mr. Topham	30
Jennette	1847	Mr. Topham	30
Honest Mrs. Gwynn	1843	Mr. Duckworth	29
Cleopatra 2nd	1851	Mr. Tracey	26

BULLS.

Name.	When Calved.	Buyer.	Price. Gs.
Duke of Cambridge	1852	Sir C. Knightley	280
Sixth Duke of Oxford	1854	Mr. Gunter	200
Barrington	1854	Mr. Fisher	200
The Baron	1853	Mr. Cruickshank	155
Dukedom	1854	Earl Radnor	110
Marmaduke	1855	Mr. Marjoribanks	100
Macdonald	1854	Mr. Morris	81
Autocrat	1854	Mr. Simpson	67
Noble	1854	Mr. Cator	66
Dundas	1854	Mr. Guest	65
Gevernor	1854	Brooks & Fuller	60
Aaron	1854	Mr. Bostock	50
Fits Derby	1854	Mr. C. Abbott	50
Friar John	1854	Mr. Hall	50
Dauntless	1854	Mr. Hallett	50
St. David	1855	Mr. Bramston	45
John of Glo'ster	1855	Mr. Dodwell	42
Douglas	1854	Mr. Tracy	35
Nelson	1854	Mr. Jepson	34
Captain	1854	Mr. Duckworth	24
Napier	1855	Sir J. Lubbock	23
Harry of Glo'ster	1854	Mr. Robinson	18
Fidelio	1855	Mr. Crump	17
Alliance	1855	Mr. Chambers	15

	£	s.	d.
Aggregate of the 77 Cows and Heifers	£5,915	14	0
Aggregate of the 24 Bulls	1,928	17	0
Total of the 101 lots	£7,844	11	0

Being an average of £77 18s. 4½d. per head.

THE LATE MR. BOLDEN'S HERD.

On Friday, the 27th of April, the celebrated stock of short-horned cattle, the property of the late John Bolden, Esq., of Hyning, took place at Springfield Hall, Lancaster. There was a remarkably good attendance from all parts of the country, and we noticed the presence of some visitors from Ireland. Mr. Strafford officiated; and the competition was very spirited, as the following prices will show:

Dowager Queen	1842	Mr. Carr	27
Florence	1845	Mr. Adcock	86
Linda	1845	Mr. Hetherington	34
Pearl 2nd	1848	Mr. Cartwright	65
Gertrude	1848	Mr. Torr	100
Roan Twin	1850	Miss Dalton	50
Red Twin	1850	Mr. Vernor	50
Pearlette	1850	Mr. Alexander	70
Isabella Howard	1851	Mr. Bromley	46
Prune	1852	Mr. Bland	100
Lady Hopetown	1852	Mr. Torr	220
Pearl Powder	1853	Mr. Cartwright	52
Burletta	1853	Mr. Bromley	36
Isabella 2nd	1854	Mr. Knowles	37
Lisette	1854	Mr. Whalley	40
Prunella	1854	Mr. Bland	50
Miss Warton	1855	Mr. Knowles	20

BULLS.

Duke of Bolton	1853	Mr. Adcock	105
Viadot*	1854	Mr. Blackstock	57
Hymen*	1854	Mr. Douglas	51
Vocalist*	1854	Mr. Bland	62
Cherry Duke*	1854	Mr. Jefferson	62
Hyning	1855	Mr. Dalzell	20
Bonaparte*	1855	Mr. Bland	30
Petterill	1855	Mr. Whalley	21
Blucher*	1855	Mr. Bland	52
Brilliant	1855	Mr. Cartwright	62
Third Duke of Bolton	1855	Mr. Douglas	40

The bulls marked * were bred by Mr. S. E. Bolden.

SALE OF SHORTHORNED CATTLE AND SOUTH-DOWN SHEEP AT BURTON-ON-TRENT.—On Monday, April 23rd, the stock of Mr. Thomas Robinson, consisting of about 50 head of bulls, cows, heifers, and calves, and 100 head of rams, ewes, and lambs, were sold by Mr. Wetherall. The company, which was very numerous, included many of the neighbouring aristocracy, and several eminent breeders from a distance. The general condition of the stock, their symmetry, and early maturity were greatly admired, and the prices realised show their merits were well appreciated. The sale realised £2,000. The Earl of Aylsford bought Lord Raglan for 66 guineas, and Honey Flower for 42 gs.; Sir John Crewe, Bart., Miss Topham and 3rd Duchess of Wiseton for 60 gs.; the Hon. Col. Douglas Pennant, of Penrhyn Castle, Bangor, Buttercup for 66 gs.; John Garlick, Esq., Vapour for 52 gs.; Mr. Crisp, Nell for 62 gs.; W. H. Des Vœux, Esq., of Drakelow Hall, Duchess of Lancaster for 41 gs., 2nd Duchess of Lancaster for 70 gs., and 3rd Duke of Oxford for 28 gs.; Henry Chandos Pole, Esq., of Radbourne Hall, 2nd Duke of Oxford at 30 gs.; William Flemming Fryer, Esq., Wolverhampton, Oak Apple for 41 gs., Duchess of Wellington at 43 gs., Duchess of Tortworth for 45 gs.; Mr. Cox, of Brailsford, Sir Thomas Bates for 43 gs.; A. Cruickshank, Esq., of Aberdeen, Chance for 63 gs.; Ralph Sneyd, Esq., of Keele Hall, Duchess of St. Albans for 26 gs.; Mr. Spearman, of Newton Hall, near Durham, Florence at 50 gs.; Mr. Wilson, of Burton Pidsea, Holderness, Hull, Dorothy at 61 gs., Wellington 67 gs., Smithfield 45 gs., and 3rd Duchess of St. Albans 41 gs., also Sir Colin Campbell 66 gs.; Mr. Webb, of Haselour, Lord Cardigan at 37 gs.; Rev. W. Leeke, of Holbrook, Derby, Lady Bates, Grand Duchess, and other valuable heifers at the sum of 148 gs.; J. Milner, Esq., near Driffield, Duke of Lancaster at 40 gs.; John Daniel, Esq, of Coton Park, a roan bull calf, Duke of Wellington; and Mr. Princep, of Newton Regis, a red bull calf, 4th Duke of Oxford. Other gentlemen in the neighbourhood were purchasers of the young stock at fair prices. Mr. Hume, for the Earl of Lichfield, bought six lots of sheep, and W. H. Des Vœux, Esq., Josiah Spode, Esq, of Armitage Park, Mr. Lowe, of Comberford, Mr. Brown, of Linton, Mr. Bakewell, and Mr. Smith, were also purchasers of sheep. The ewes ranged in price from £2 10s. to £5 10s.; the rams at proportionably fair prices. A pen of three splendid fat wethers were bought by Mr. W. Atkin, of Derby, for £10 17s. 6d., one of which, speedily slaughtered, attracted great attention, being a perfect model of the pure Southdown breed.

ORIENTAL BUNIAS (Bunias orientalis) is a native of the Levant and of Russia. It was first brought into notice in this country by Arthur Young, Esq, and much resembles the dandelion in the growth of the roots and leaves. The plant is not very early, but it bears mowing well. It is less productive than chicory, is cultivated in the same manner as that plant, and applied to the same uses as food. Its nutritive qualities are equal to those of the broad-leaved clover: 64 drachms of the stems and leaves, at the time the seed is ripe, afford 100 grains of nutritive matter. The same weight of leaves cut at the beginning of May affords only 70 grains. About the first of May 64 drachms of the following substances yielded of nutritive matter:—Herbage of hogweed, 90 grains; Lucerne, 90 grains; Burnet, 100 grains; Bunias orientalis, 100 grains; Broad-leaved red clover, 80 grains.

THE PRESENT APPEARANCE OF THE WHEAT CROP.

It is very true that the wheat plant has suffered materially, especially on light exposed soils, by the severity of the winter, which even still seems to linger with us; but we have reason now to believe the damage is not generally so extensive as was once feared. We have been carefully examining some large breadths of land under wheat on the thin light barley soils of Surrey, resting immediately upon the chalk, which support such a conclusion. These large fields, when we visited them early in May, appeared more like fallow lands than wheat crops; when we saw them in the last days of April, hardly a green blade of wheat was to be seen in a rod. The heavy roller has since been over them, and now the plants are slowly making their re-appearance. That the portion of the wheat above ground should be withered away, without killing the plant, by the drying winds and low temperature to which it has been exposed, need hardly excite our surprise when we examine the register of the weather for the season of 1854-55, and contrast the temperature of the surface and of the soil during the same period. Let us refer only to these registers for the present month, and we shall find that the lowest temperature during the night, *on the surface*, close by one of the wheat fields (100 acres) to which we have referred, *and under the surface* of the soil (18 inches), during the same period, was as follows:—

	TEMPERATURE	
	Of the surface.	Of the soil.
May 1	34	41
,, 2	30	41
,, 3	21	41
,, 4	32	40
,, 5	24	39
,, 6	28	40
,, 7	38	42
,, 8	36	43
,, 9	24	42
,, 10	39	43
,, 11	40	44
,, 12	32	43
,, 13	28	43
,, 14	34	42*

* Since the 10th, 1.07 inches of rain have fallen, equal to—say 107 tons of water per imperial acre. We have had more than half of this amount since Saturday morning.

Hence we discover that, whilst during the present month the *upper part* of the wheat plant has been exposed to drying winds and a minimum night temperature, never more than seven degrees above the freezing point of water, and commonly several degrees below 32 deg., the *roots* of the plant have not been exposed, except on the night of the 5th of May, to a temperature within seven degrees of the freezing point.

When, therefore, we are examining our wheat crops, we should remember these things, and not confine our attention to what is going on above the surface. We are too apt, perhaps, to forget that although the wheat plant is classed with the hard corn crops, yet that there are limits to even its power of sustaining the rapid evaporation from its leaves by drying easterly winds, and a long-continued low temperature. We have made strange advances, indeed, in the cultivation of this crop; but we seldom reflect upon the fact that its cultivation in this country is extended to the very verge of that mean temperature in which it refuses to ripen its seeds. From what country the wheat plant originally came is a matter of much doubt; but yet no one disputes the fact that it is indigenous in countries far warmer than our own. It is found wild in Persia, on the banks of the Euphrates, and in the warm soils of Mesopotamia. It has been contended that the valley of the Jordan, or the parts of Palestine which border upon Arabia, may reasonably be assigned as the native country of the wheat plant. At any rate, all are agreed that this cereal has followed the train of agriculture into gradually decreasing mean temperatures, from the banks of the Nile to the valleys of Greece, and through the Italian peninsula to far more northerly soils. A portion of the surface of our globe has been sometimes divided by the natural philosopher into certain cereal zones. It was when speaking of that adapted to the cultivation of wheat, that Mr. Whitley, in his essay on the climate of the British Islands in its effect upon cultivation, indirectly paid a well-deserved compliment to the growers of British wheat, when he asked, "In what part of this cereal zone are our Islands situated? Certainly not in that best adapted for wheat, which is grown in greater perfection on the plains of Egypt, and in the dry hot summers of Spain. The summer temperature of the cultivated lands of the British Isles varies from 54° to 64°; in the rich plains of Lombardy it is 73°; and in Sicily, the granary of *ancient* Rome, 77°." There is, in fact, no portion of Europe where the wheat crop is pressed into so low a summer temperature as in our own islands, and that with a considerable degree of success; and we may note that in our lands it is still advancing towards the north.

In 1727 a field of wheat, near Edinburgh, drew numerous admiring visitors to the phenomenon. Its cultivation had made little progress there even in 1770; but now it is raised in abundance on the lowlands, favourable hill districts are invaded, it has successfully been established on the shores of the Murray Frith. We see then that when we are remarking on the injurious influences to which our wheat crops have been recently exposed, we should not forget the vitality it displays, nor the obstacles to its progress to which it is exposed, in a climate so different as ours is to that of its native country.

THE MANAGEMENT OF OSIER GROUNDS.

We adverted on a former occasion to the facilities which this journal affords for the collection of information on practical questions, in consequence of its extensive circulation among practical men—that is, among men engaged in farming as the means of obtaining a livelihood; and we appealed to the numerous queries and replies on such subjects which appear from time to time in our columns, in proof of the estimation in which they are held by the public as the medium for obtaining such information. These communications, however, too often possess an isolated character, and would have a greater value if they could be made to assume a more systematic form. It has occurred to us, therefore, that it may be advantageous that we should occasionally draw the attention of our readers to certain questions of practical interest, and request information upon them drawn up in a more systematic form. The valuable information thus obtained we propose to condense, to arrange, and systematize.

The subject to which we propose in the first instance *to draw attention* will be that of the returns, expenses, and best method of raising and managing osier grounds; the expenses of maintaining them; and the returns which they are capable of yielding annually, or at longer intervals, according to the purpose to which their produce is applied. We will not introduce the subject with the hacknied proverb expressive of the profit attending this kind of planting, which says that the willow will purchase the horse while the oak is purchasing the bridle; nor will we adduce, in proof of the profits attending such kind of planting, the old story that in Holland a young man is not allowed to marry till he has made a willow plantation. We will rather advert to the stimulus which the railway system is giving to the planting of osiers, as well as to other industrial pursuits. We have seen new plantations of this tree springing up on wet land, or land liable to be flooded, by the side of some of our principal lines of railway, and have been informed that such land has been taken on lease, for the purpose of forming these plantations contiguous to railways, by means of which the produce may be conveyed to the osier market from distances which by the old modes of transport would be prohibitory.

We shall request those of our readers who may be disposed to favour us with communications on this subject to treat it in the following order:—

1. The best soil and situation.
2. The different sorts of osier, and the several purposes for which they are best adapted.
3. The method of preparing the ground.
4. The season for planting and method of planting, and the quantity of sets to the acre.
5. An estimate of the cost of planting, and keeping clean, till the first crop can be taken.
6. The annual expenses.
7. The annual produce, supposing it to be cut for basket-making and similar small ware.
8. The value of the produce, supposing the crop to be cut at longer than annual intervals, for other purposes.
9. Any information not included under any of the above heads, which the writer may consider worthy of communication.

The information thus furnished will be published from time to time as it is received, with or without the writer's name, as he may desire. All we require is that assumed signatures may be substantiated by the writer's real name and address, communicated confidentially. When the whole shall be received we will devote a leading article to the publication of an epitome of it.

Should the result of these queries respecting osier beds prove as satisfactory as we anticipate, there are several other subjects on which we shall endeavour to collect the experience of practical men, to be condensed and arranged in a similar manner. We are persuaded that there is a vast amount of useful practical knowledge which may thus be called forth from men who will sit down to answer queries when they would shrink from the attempt to write a regular essay. To draw out latent talent of this kind, and to collect information which would otherwise be lost, we consider a worthy object for the exertions of every man who feels an interest in the progressive improvement and intrinsic worth of all communications contained in this agricultural journal.

THE STEAM PLOUGH.

It is now just upon two years since the London Farmers' Club met to consider the application of steam-power to the purposes of agriculture. The discussion on that occasion was, as might have been expected from such a man, very ably and fairly introduced by Mr. Allan Ransome. He was, too, as becomingly supported by the members present; and the debate altogether ranks amongst the most useful of those to be found in the reports of "the Bridge-street Parliament." The wording of the subject had necessarily instituted a comparison between the fixed and portable engine; and in drawing this, it became, of course, quite as much a matter of duty to ascertain what either could be brought to do in the business of the Farm. In the words of Mr. Ransome, they might be "generally employed in thrashing the crop, grinding the corn, cutting the chaff, steaming food for cattle, and sawing wood." Mr. Cuthbert Johnson, again, would prefer the fixed engine, especially for its use "in raising water for irrigation:" while Mr. Thomas added, from his own experience, the items of "winnowing and the grinding of malt." These were the general principles upon which the uses of steam for agricultural purposes were argued, and upon which the recommendation embodied in the resolution was based. Mr. Baker, to be sure, did say further than this, that "the work would be complete when they had arrived at the ultimatum of a steam machine for ploughing, of which he did not despair." Such a Utopian notion, however, was only greeted with "laughter," and almost immediately afterwards corrected by Mr. Nesbit, who "did not believe that steam would ever be employed in ploughing land," and who "did not think it was in that department the farmers stood so much in need of the assistance of steam."

The members of this same Society met on the first Monday in May, to again consider the application of steam-power to the purposes of agriculture. The question was now introduced, and the bearing of the discussion directed not by a sanguine engineer, but by a practical working farmer. It was tolerably well understood, moreover, that the object of this gentleman was to extend the uses of steam to a branch of farming operations in which hitherto it had been but little employed, and with almost as little effect. Mr. Williams, of Baydon, had, in fact, invented a steam plough that was to work efficiently and economically. He had exhibited a model of this at the last meeting of the Smithfield Club, and was said now to be yet more confident of its success. In a word, everybody came to hear "all about the new steam plough."

Mr. Williams had no reason to quarrel with his audience. It was remarkable, indeed, to notice how much the tone and spirit of the meeting had advanced since the occasion to which we have just referred. There was no "laughter" now at the mention of "that ultimatum—ploughing by steam." There was no confident opinion that land never could be ploughed by steam. On the contrary, almost every speaker gave Mr. Williams some encouragement, as all allowed him credit at least, for what he has attempted. Indeed, if the meeting did not go deeper into the merits of the invention it was only the fault of Mr. Williams himself. He undoubtedly came armed with a very excellent paper, detailing what the steam-engine had already done for agriculture, and entering at some length into the rather questionable success of what has so far been achieved in ploughing by steam. He proceeded, too, entirely in accordance with the wording of the subject, into the results that would follow the establishment of this practice. The especial advantage that would follow, both to the farmer and to the country, from the saving or doing away with horse labour—when it was once proved that we could economically *do* without it. Here was the point of the whole story. This was what we all came to hear explained. So far, steam ploughing had hardly become reduced to a practical application; and we looked to a practical farmer for a solution of the difficulty.

Mr. Williams can scarcely be said to have done himself justice. He brought no model of his invention, or the system of working it; while it appears we are to have no more tangible proof of its real merits at Carlisle. The little he did offer on his own patent is easily collected :—

> "When I first conceived the idea of putting my portable engine to such a purpose, after a great deal of consideration I came to the conclusion that if steam-ploughing could be accomplished, it ought to be done by the simple 4, 5, or 6 horse-power engines which are generally used for farm purposes. I likewise discovered that such an engine would be quite sufficient to propel from three to six ploughs at a time, according to the nature of the soil, inasmuch as my engine (one of 5-horse power), which drove a strap nearly at the rate of 20 miles per hour, by reducing the speed to about 2 miles per hour would increase her power exactly in the same ratio as the speed was diminished. The advantages appeared to me to be so great, that I immediately set about constructing a machine, to be driven by the engine, which will plough a 20-yard land without moving, and draw the ploughs in

> furrow backwards, as well as to her, by means of a pulley fixed in a frame at the other end of the field. It will not be a difficult task to prove to all practical men, that if steam-ploughing is brought about, it should be done by the same engine that does the other work of the farm; and as a 6-horse engine is the outside power that is generally required for that work, so it will be quite sufficient for all field purposes. I am certain that with a 6-horse-power engine driving a machine I am now about to make, considerably lighter than the one I have tried, I shall be able to draw at the rate of 2 miles an hour, from four to six ploughs at once at the ordinary depth which is ploughed in the West of England, to plough both to and from the engine, draw out the spare rope, plough from 10 to 20 yards in width without moving the engine; and when required to move, the engine shall propel both herself and the machine on to the next land."

The meeting could not do much with this. The first speaker, indeed, who followed Mr. Williams expressed his disappointment at the want of a model; and then the discussion gradually turned on the cost and general efficiency of such steam ploughs as are at present at work. Opinion here was somewhat divided, more particularly on the question of expense; it is pretty evident, however, that none yet have reached anything like that perfection which would warrant their coming into common use. This matter of expense of course hinges a great deal on the machine to be used. Mr. Williams is all for the one portable engine of the farm; and, in fact, this further employment of steam would seem to argue a returning feeling for the moveable power. At the meeting assembled to hear Mr. Ransome, it must be remembered, such a service was never recognised; though even on Monday last, one speaker expressed his belief that "the time was not far distant when a stationary engine on any part of a farm might be made to transmit its powers to any field on the farm, with precision and economy." Although the meeting scarcely leant to such a means as this, the question itself was unanimously treated as "only a matter of time," with every inclination to receive Mr. Williams's invention as "a step in the right direction." It is only to be regretted that the organ of caution prevented that gentleman giving us a little more information about it.

It is instructive to notice in the succession of meetings like these, how surely the farmers of the kingdom *are* progressing. At the meeting in June 1853, a reference to the possibility of ploughing by steam was received with "laughter;" and only again alluded to when contradicted. At the meeting in May, 1855, every attention and encouragement is given to the man who would perfect such a possibility, which is itself considered to be but "a matter of time." Let us even trace these sittings a little further back on something of this same question—mechanical power. "Four years ago," said Mr. Thomas, speaking in 1853, "it was his lot to open a discussion on the subject of machinery, and he then dwelt on the unavoidable necessity there was that the farmers of England should use machinery to a larger extent. He showed that so far from the employment of machinery being any disadvantage to the labouring poor, it would in the long run be an advantage to them; inasmuch as by increasing the productive powers of wealth, it would enable the farmer to employ more and more hands, and to bring his land into a higher state of cultivation. The conclusion he drew was negatived by a majority of more than two to one. He congratulated the Club on having changed its opinion." It is a congratulation that is now equally applicable to the whole country, and that may be here again very honestly repeated. What better example could we want of the enterprising spirit of the English farmer? A strong Protectionist, when protection is lost to him, instead of sitting himself down in obstinate despair, goes bravely to work and invents a steam plough! "A model farmer" of the most approved school could not have done more.

LONDON, OR CENTRAL FARMERS' CLUB.

THE GENERAL APPLICATION OF STEAM-POWER TO AGRICULTURAL PURPOSES; AND, IF PRACTICABLE, WHAT WOULD BE ITS NATURAL RESULTS?

The usual monthly meeting took place on Monday, May 7th, at the Club House, Blackfriars, Mr. Shearer in the Chair. The question for discussion, introduced by Mr. J. Williams, of Baydon, Wilts, was "The General Application of Steam-power to Agricultural Purposes; and, if practicable, what would be its natural results?"

After a few introductory remarks from the Chairman,

Mr. Williams said: Sir, with regard to the general application of steam power to agricultural purposes, I would first remark that there can be no doubt that the manufacturing interest owes its hitherto flourishing condition, the high position that its members have attained, and the immense wealth of most of the leading firms connected with it, to the unlimited power of steam. Equally apparent to all who are practically acquainted with agricultural pursuits is the expensive mode of cultivation that farmers have been obliged to adopt—viz., manual and horse labour; because, till within these few years, they have had no opportunity to use steam power except as a fixture, and even in that case only to a limited extent. But the case is now altered, for the science and practical talent of our spirited engineers and implement makers have furnished us with portable engines and machinery calculated to overcome the difficulties which have hitherto stood in our way; and without a portable engine the subject for this evening's discussion would be fruitless. Portable steam-engines now being at our command, I will as briefly as possible attempt to describe the several purposes to which they have been practically applied, and then call your attention to the grand ultimatum of generally cultivating the soil, if possible, by means of this gigantic power. First, with respect to thrashing machines, grinding mills, chaff cutters, and any other purpose to which steam power has hitherto been applied about a homestead, a question might arise as to the best mode of performing the work—whether by a fixed engine or by a portable one. For myself, I have never had a doubt, since I saw the first portable engine practically at work, that it was the engine best adapted for general farm purposes, and was likely to prove of great benefit to the agricultural interest. A fixed engine, it is true, has its advantages, requiring less fuel, having its water at hand, and being always ready for work, while the work is done to the best advantage under cover; but against these advantages must be placed the immense cost of hauling the whole produce of the farm to one point—and in nineteen cases out of twenty not a central one—and then drawing the whole of the manure back again—and this simply for the purpose of having it thrashed, seeing that all the rest might be accomplished on the spot where it grew. On the other hand, the portable engine is at your command wherever you require it, and will accommodate your neighbour as well as yourself. Little requires to be said respecting the practicability of the engines and machinery now placed at our command by our spirited engineers; we all admire the perfect manner in which they are most of them got up. Before I proceed further with the subject of steam power, I will just allude to a system which I have no doubt can and will be adopted, with respect to thrashing corn in the fields where it is grown. I have just mentioned that with a portable engine you can go into the fields where the corn is stacked, and thrash it on the spot, whereby a great saving of time and expense—two ingredients most essential to the farmer, and more especially in harvest time, when stacking—is obtained. But then I fancy I hear the question from every practical farmer in the room—"What description of manure will you get, if you adopt such a system as this generally?" I will anticipate the question, and attempt an answer. I will imagine a farm of 300 acres in extent, and whether the homestead be at one end (which is too often the case) or in the centre, I will assume the produce of the 100 acres nearest the homestead to be drawn thereto. The produce of the other 200 acres can then be stacked where or near to where it grew, thereby facilitating the work, as the loads will not require binding, and the carters will not be hindered, as is too often the case, for want of an empty waggon in the field. Now, if the four-field system be adopted, the very land which produced the Lent straw crop will require the manure next year, either for a green crop, or for wheat; and, assuming that a crop of turnips or swedes is growing in an adjoining field, the rick can be placed close to the piece, that the fodder may be consumed with the turnips; the steam-engine being taken there for thrashing the corn when required. Of course, a pen or yard of hurdles must be made for the sheep; and when they have finished, the straw left will be of little value, provided it is left in that state; but by doubling the hurdles, with straw between, and having an old waggon-carriage lengthened and roofed, containing a small granary over the hind part, similar to this, [Mr Williams here referred to a model on the table], a temporary yard for pigs, with a house, will be obtained, and with good feeding, the straw will be converted into excellent manure. The pigs, likewise, will consume any stray corn which may be left in the same, and will be far more healthy, while shifting from place to place, than they are when continually kept in one yard at home. A portion of the animal manure made at the homestead could be drawn and mixed with that which was thus obtained; and the heap would be as good in quality as if the bulk of the straw had been drawn home to the fixed engine; the expense and time of double cartage being, moreover, saved. I allude to this system more particularly, because my object will be to show, in substituting steam power for horse labour, as great a diminution of the latter as possible. Returning more immediately to the subject of steam power, I will next notice Mr. Mechi's irrigation by steam. Although I do not bind myself to all that gentleman's theories, I cannot but admire the determination he shows not to be overcome by the difficulties he has met with, in carrying his principle into practice. I have never witnessed his method of doing it; but I have been informed that the whole of his manure is distributed over the soil by means of force-pumps, with an air-pump to stir up the solid matter at the bottom of the tank, that it may go off with the more liquid portion at the top, thus saving a considerable amount of carting usually done by horses. This system of irrigation appears, from Mr. Morton's late lecture on Italian Rye Grass, to be adopted in some few instances in Scotland, and with very great success; but how far it will answer the purpose in a general way, except where an unlimited supply of liquid manure can be obtained, I am not prepared to say, and I doubt if (except in few cases) it would ever repay the outlay required to bring it practically to bear. Mr. Mechi has written to me respecting his steam-engine: "My steam-engine is at 30lbs. pressure per inch, and 70 revolutions per minute, of six-horse power; but as we work at 70lbs. per inch, and evaporate 70 gallons of water per hour, we get eleven-horse power out of her; she works a pair of four-feet-four-inch mill stones, drives the chaffcutter, thrashing machine, and dressing machine, pumps all the water for the live stock, works a pair of force-pumps for irrigation, twenty-inch stroke, and six inches diameter, throwing 100 gallons per minute; a linseed crusher and an air pump are also depending on the steam-engine. It has been in use eight years, and is likely to last many more; the consumption of fuel is 10 cwt. of coal per diem of ten working hours : without it we should be in a poor predicament " Fowler's draining plough is another instance of the practical application of steam power to agricultural purposes. I made a journey into Hertfordshire, about two months since, to witness its operation; and I feel convinced from what I there saw, backed by my own experience, that the bringing of steam power into general use is only a question of time. I saw there an eight-horse-power engine, made by Clayton and Shuttleworth, drawing not less, in my opinion, than 200 horse power, including the friction of the machine, wire rope, &c. The engine was stationary at one end of the field, and the distance which it appeared capable of working the plough at the further end was nearly, if not quite, half-a-mile. It did its work in a most practical manner, drawing in the pipe tiles, and finishing the work to the satisfaction of all who saw it. There are instances too numerous to mention, in which landlords do a great amount of labour for repairs, &c., by the power of steam. The steward of Lord Willoughby D'Eresby writes me word: "The engines (the same which draw the plough) are used for thrashing corn, grinding clay, &c., for making bricks and tiles, also for sawing stones by sand and water in the stone quarries, drive circular and vertical saws for cutting wood for all purposes, besides grinding a large quantity of corn into flour and meal." I now come to that part of my subject which has reference to what is most to be desired, but what also there is no question is the most difficult, viz., the ploughing and cultivating of the soil by steam power. Several attempts have been made at different times to accomplish this hitherto difficult task. As long ago as January, 1618, David Ramsey, a page of the King's bedchamber, obtained a patent, "to exercise and put in use divers newe apt formes or kinds of engines and other pfitable invençons as well to plough grounds without horse or oxen, and to make fertile as well barren peats, salt, and sea sands, as inland and upland grounds, within the realmes of England, &c." This, in all probability, was the first idea of ploughing by steam, or otherwise than by animal power; and we may conclude that it proved a failure, as we have neither seen nor heard of its effects. The next attempt that I am aware of was made by a Mr. George Whitley, who invented and patented an engine, with machinery attached, as long since as the year 1837. The engine was made to travel—as you may see by this drawing—and it requires but a slight knowledge of engineering to convince any one, that such a system must have failed. Mr. Hannam, of Burcot, Oxfordshire, has also tried the steam-engine for ploughing; but from what I can learn, without success. Lord Willoughby D'Eresby, has been somewhat successful with his ploughs. His steward, Mr. Scott, writes me word: "We now use three ploughs at once, and they work right and left-handed, alternately; we can plough in eight hours, about four acres of land, at a cost of about 35s. per day, including men's wages, fuel, oil for engines, and a horse and watercart to convey water to the engines." You will observe this is somewhat less than 9s. per acre, and considering that Lord Willoughby uses two engines, one at each end of the field, which must be a great expense as regards fuel (it being necessary to keep up two fires, whilst only one engine at a time is at work), if the land is well ploughed at that cost, it is a step in the right direction. Some two years since, I had the pleasure of seeing the engines at work on Prince Albert's farm at Windsor, and I then thought they were not drawing a sufficient quantity of ploughs according to the power of the engines. Two ploughs were rigidly combined, and this circumstance prevented in a measure their making such good work as they might otherwise have done. It appears that they have now altered the number to three, and I am satisfied that they possess power to propel seven or eight. Lord Willoughby has kindly invited me to see his ploughs at work, offering to put them on, any day that I may appoint; but I have been so pressed for time as to be obliged to decline his kind offer, or I probably could have given you a more detailed account of his proceedings. The Marquis of Tweeddale, at Yester, in Scotland, has been ploughing by steam-power. I wrote to his lordship to ask if he would allow his steward to give me information on the subject. In his reply he most condescendingly gave me a long detailed account of his proceedings; from which I gather that with two 14-horse-power engines he propels two ploughs at the rate of 2½ miles per hour, ploughing the immense furrow each of 14 to 15 inches in depth, whilst the two furrows take a breadth of 30 inches, or 15 inches each. The soil is generally a stiff tenacious clay; so you may imagine the immense strain of two such furrows, with the friction of the rope going at the rate of 2½ miles per hour! His lordship mentions some of the difficulties he has had to contend with; amongst which are stones, pan, and roots of trees, which, from the circumstance of his ploughing to the depth of 15 inches, of course renders him the more liable to meet with. But he has overcome these obstructions by ploughing with horses in the localities where they existed, and having once been surmounted the difficulty no longer exists. Another objection which the Marquis describes is, the weight of the engine, and the friction of the wire rope by which it is drawn—a subject which I will further allude to, as I proceed. Mr. Usher, of Edinburgh, who has invented a steam-plough to travel over the surface of the soil and plough the ground by a rotary motion, states, in reply to a letter which I wrote to him: "The drawbacks I had in my first machine were want of steam-power and too much weight. The first of these I have obviated in the new one by having 210 feet of heating surface in the boiler, against 130 feet in the last one, which gives six horses' more steam; and the latter objection I think will be entirely overcome by this additional power. The work done I think is nearly perfect, being exactly such as C. W. Hoskyns has set forth so vividly in the little volume 'Talpa,' and the expense per acre is about one-third of the cost by horses." He intends, if all goes on well, to try its merits at the Royal Agricultural Society's show at Carlisle. Mr. Mechi, too, I believe, has had a finger in the pie, and likewise in his pocket, in attempting this desired object; but, I believe, without success. I have now mentioned all the individuals, so far as I am aware, who have made any attempts to cultivate the land by steam-power, and have given you what information I have been enabled to obtain. I will now add that I, myself, have been studying this subject for the last three years, and have succeeded in bringing out a very different implement from any of those which have been before described, viz., "a ploughing machine;" and so satisfied am I of its practicability that I have taken out a patent for the invention. When I first conceived the idea of putting my portable engine to such a purpose, after a great deal of consideration I came to the conclusion that if steam-ploughing could be accomplished, it ought to be done by the simple 4, 5, or 6 horse-power engines, which are generally used for farm purposes. I likewise discovered that such an engine would be quite sufficient to propel from three to six ploughs at a time, according to the nature of the soil, inasmuch as my engine (one of 5-horse-power), which drove a strap nearly at the rate of 20 miles per hour, by reducing the speed to about 2 miles per hour would increase her power exactly in the same ratio as the speed was diminished. The advantages appeared to me to be so great that I immediately set about constructing a machine, to be driven by the engine, which will plough a 20-yard land without moving, and draw the ploughs in furrow backwards, as well as to her, by means of a pulley fixed in a frame at the other end of the field. It will not be a difficult task to prove to all practical men, that if steam-ploughing is brought about, it should be done by the same engine that does the other work of the farm; and, as a 6-horse engine is the outside power that is generally required for that work, so it will be quite sufficient for all field purposes. Remember, one of the difficulties the Marquis of Tweeddale has met with is the weight of the engine; and Mr. Usher has written to the same effect. And again, there is another grand consideration, viz., the cost of the engines, more especially where two are used, which would put it out of the power of most farmers to meet so great an outlay. I am not at present prepared to say what amount of ploughing I shall be able to accomplish per day; but of this I am certain, that with a 6-horse-power engine driving a machine I am now about to make, considerably lighter than the one I have tried, I shall be able to draw at the rate of 2 miles an hour, from four to six ploughs at once at the ordinary depth which is ploughed in the west of England, to plough both to and from the engine, draw out the spare rope, plough from 10 to 20 yards in width without moving the engine; and when required to move, the engine shall propel both herself and the machine on to the next land. From what I have seen of the power of the machine which I have constructed, I feel convinced that it might be applied to many purposes. For instance, if I had had sufficient time, I meant to have used it to grub a hedge-row; and I feel confident that with the engine attached, it would pull up the roots in the same manner that a dentist draws teeth, namely by means of the leverage of the instrument. As far, then, sir, as I have been enabled to observe, I do not hesitate to give it as my opinion that it is, or will be practicable to cultivate the bulk of the soil by means of steam-power, and that it is only a question of time as to the best mode of doing it. The remainder of the question which I have undertaken to introduce is, "if this great work should be practical, what would be its natural results?" There are three especial objects which I have no doubt will be affirmed, if this gigantic undertaking can be accomplished. In the first place, the work on all wet soils will be much better done, as the treading of the horses will be avoided; and again, with regard to a wet season, when the farmers, afraid of getting behind with their work, often go to plough when they ought not to do so, thereby doing as much harm as good. They may rest satisfied that, when the weather holds up, their steam plough will do one-and-a-half or two days' work in one, not requiring to go home to be fed and groomed; and moreover, if they should be compelled to do the work in the wet, they will still have the advantage of not treading with horses. In the second place, I will allude to the individual benefit which the farmers and labourers will in all probability derive from this system. The farmers would require a considerably less amount of horse power, which is always a sinking fund; they would be enabled to do their work at the best seasons, and I imagine at considerably less cost. I am not prepared to say at what cost; but I will assume, from what I can judge of my own proceedings, and looking forward to a more perfect system, that I should be able to plough six acres per day of nine hours with a six-horse engine. The expenses, as far as I can look into them, from the number of hands required, would be about as follows:

Dr.	£	s.	d.	Cr.	£	s.	d.
6 cwt. of coal	0	6	0	By ploughing 6 acres of land, at 5s. 6d. per acre........	1	13	0
Oil..............	0	1	0				
Water-carting	0	2	6				
Engineer	0	3	0				
Steersman........	0	3	0				
Conductor........	0	3	0				
4 men, at 2s. each	0	8	0				
2 stout lads	0	2	0				
	1	8	6				
Wear and tear, 15 per cent.	0	4	6				
	£1	13	0		£1	13	0

If these figures of mine at all approach to what may hereafter prove a fact, it will require but little argument to convince any farmer that to plough or cultivate the land for 5s. 6d. per acre is what he has never been able to do before. With respect to the labourers, I am satisfied that the more machinery and steam power are introduced, the better will be their position in society. It is a mistaken notion to suppose that the introduction of steam power will displace the demand for manual labour; for facts prove the contrary. Those who employ the greatest amount of machinery employ likewise the largest number of hands. Labourers will, indeed, be required to make a better use of the talents they are blessed with. They must brush up their minds, and enlarge their ideas. For the better work which they are enabled to give they will receive better pay; and if they practise economy, instead of spending their surplus money at the alehouse, their families will be better educated, better clothed, and better fed. There is still another class of men who will be greatly benefited by this change—the engineers and implement-makers, owing to the number of engines that will be required as a substitute for horse power. Lastly, I shall place before you a statistical account of the immense benefit the nation at large would derive from the practical accomplishment of this herculean task. Several years ago, Mr. Couling, in his survey, estimated the number of cultivated acres in Great Britain at 46,522,970, and the number of uncultivated acres at 15,000,000. Now we all know that an immense number of acres has been broken up since—probably a million; but I will content myself with adding to Mr. Couling's estimate of cultivated acres less than half a million, viz., 477,030, which will make 47,000,000, assuming that that number is under cultivation at the present time. I must here add, that Mr. Couling is a high authority in this matter, having been quoted by Sir Archibald Alison in his "History of Europe"—by Mr. Porter, and others. The next conclusion that I wish to arrive at is the number of horses necessary to cultivate 100 acres. For my own part, I have ever been of opinion that it would require four. I have asked scores of practical men, and they all agree with me as to the number required. But we have now something more than mere opinions—we have the statistical returns made by 1,100 tenant-farmers of Scotland, and by a large majority of the farmers of the counties of Norfolk and Hampshire; and although these returns cannot be considered perfect, yet for this purpose they are sufficient, seeing that as far as the returns extend, the number of horses mentioned represent the exact number kept to cultivate the number of acres returned. The Highland Society of Scotland have made a return from 1,100 tenant-farmers of the number of acres they occupy, and the number of horses they keep. The return gives, to 3,431,485 acres of cultivated land, 156,595 horses employed. This is 2,182 over 4½ for every 100 acres; and as the Scotch acre is larger than our own, the result is not far from what I have stated. The county of Hants has returned 603,219 cultivated acres, and 24,076 horses kept thereon, being 52 less than 4 to every 100 acres—also corroborating my opinion. The county of Norfolk returns 621,833 cultivated acres, and 30,334 horses to work them, being 5,462 over and above the number before alluded to. There can be no doubt, then, that if I fix the horse-power necessary to cultivate the land of Great Britain at 4 to every 100 acres, I cannot be far wrong; and, taking the number of cultivated acres before stated at 47,000,000, and multiplying them by 4 to every 100, I arrive at the enormous quantity of 1,880,000 horses kept for the purpose of tilling the soil! If I multiply the number by 30, the probable average value of each horse, it will give the astounding sum of £56,400,000! Now, as to the annual cost to maintain this number of horses. They cannot, in my opinion, taking the prices of the past year, be kept for a less sum than £30 each, to which must be added £5 per horse for casualties (depreciation), wear and tear, shoeing, and harness. There are various opinions as to the cost of maintaining a horse for a twelvemonth, but in ninety-nine cases out of a hundred it is all assumed. By not reckoning strictly everything horses consume, people are led to suppose that they can be kept for a less sum than I have named; but where a regular account is kept the case is different. I can mention an instance of a gentleman who is present (Mr. Thomas, of Bedfordshire), who is noted for the admirable accounts which he keeps, and who has written to me to the effect that his horses cost him, with corn at the present price, not less than 14s. per week, or £36 8s. per annum, besides casualties, wear and tear, &c. I do not take his figures, because I think the bulk of the horses alluded to are not kept so well as his; but it is a question whether such keeping is not the cheapest in the long run. Reckoning, therefore, the maintenance of each horse at £30, the annual amount is the same as the cost price before mentioned, viz., £56,400,000! It has likewise been asserted by our friend Mr. Baker and others, that the horses consume from a fifth to a fourth of the whole produce of the soil. It now remains to consider what portion of this horse-power could be dispensed with, provided steam could be applied as a substitute? If the bulk of the soil could be tilled by steam, I am inclined to think half the horses might be spared, by stacking the corn in harvest where it grew, as I mentioned at the commencement of my remarks; but, as I wish to keep within bounds, I will only take a third, which would amount to the number of 626,666 and a fraction, and then the annual cost of maintaining them would be £18,800,000, which would be saved, not only to the farmer, but to the kingdom at large, inasmuch as the food previously consumed might and would be turned to a better account. I have been often asked, "If you do away with your horses, what will you do for manure?" The question might as well be put, "What will you do with the food the horses would consume?" As this is the last and most interesting part of this question, let me state, though I shall probably astonish some of my hearers in doing so, the amount of animal food which could be produced with the farm produce thus saved. It will be seen, from the above calculation, that by dispensing with one-third of the horse power necessary to cultivate the soil, a saving in corn and fodder would be effected to the amount of £18,800,000. Now, if I take the price of beef and mutton at 7d. per lb., or 4s. 8d. per stone of 8lbs., the food so rescued from consumption by the horses would produce, assuming that they would not be fed at a loss, 80,571,500 stones of meat; or 805,715 oxen, of 100 stones each; or 8,057,150 fat sheep, of 10 stones each. Such, Sir, would be the result if this desirable object were practically carried out; and in concluding these remarks, I will add, that as the almighty Disposer of events has intrusted to our care the task of providing the necessaries of life for our countrymen, so it is our duty, seeing that He has placed under the control of man such a gigantic power, and filled the bowels of the earth with a material to generate the same, with thankful and grateful hearts to use our best endeavours that, with his blessing, "the valleys"—aye! and the hills also—"shall stand so thick with corn that they shall laugh and sing."

Mr. **Sidney** expressed disappointment at Mr. Williams not having produced a model of his proposed plough, and after making some general remarks upon the question on the card, was succeeded by

Mr. **Mechi**, who said that last year he received an invitation from Lord Willoughby D'Eresby to visit his farm, and whilst stopping there inspected minutely the operations of the ploughs. He there saw two steam-engines, one placed on each side of the field, drawing alternately three ploughs fixed in a frame. Those ploughs were constructed on Lococke's principle, so that the breaks could be shifted, and the plough worked backward or forward as required. On level land there could be no doubt that these operations were perfectly successful; and as to cost, so far as he could discover, it would be about the same as that which had been stated by Mr. Williams and reported by Lord D'Eresby himself. But there was one material objection wherever a field happened to have an elevation, and that objection arose not from the ploughs, but from the form of the engines. They had all horizontal tubes, and the moment they were off level ground a part of the tubes would of course be without water, and liable to be burnt out. The result was that in the field in which he saw them operating the parts on the slope could not be ploughed. If vertical boilers could be used, that difficulty might be overcome; but, unfortunately, success in this respect had not yet been attained. As to his (Mr. Mechi's) acquaintance with steam-power, he believed that Mr. Romaine's engine would have succeeded, and he had spent some money in making one; but upon trying it he found that there was too much philosophy to begin with. The revolving wheels performed 240 revolutions in a minute, and the earth and stones were made to fly in all directions; but in the process an amount of power was consumed which was altogether disproportionate to the quantity of land moved. There was not time for the prongs to get into the ground; and he really thought that with fifteen revolutions a minute he should have done better than with 240 (Hear, hear). How far the engine would have the power of propelling itself he was unable to prove, because he adopted an improved system of boiler; and in order to get over the hills, the tubes were made vertical instead of horizontal; but with the high-pressure the first attempt sent the water and steam in a shower out of the boiler over the horses (a laugh). The boiler that would do a great deal of work in a horizontal form would, when the tubes were placed vertically, throw out the water with the steam, and soon become emptied. His experiment failed, therefore, because there was too much philosophy, and too little steam (another laugh); and he did not continue it, inasmuch as it would have required both a large expenditure of time and an enormous outlay of capital; and it was certainly not his wish to spend another £500 upon it. He had heard, however, that Mr. Romaine had since made some experiments in Canada that were successful; but with most new inventions they might anticipate failure at the outset, and they must be content if they advanced towards perfection by slow degrees (Hear, hear). He had seen the model of Mr. Usher's steam-cultivator, and he had a strong opinion that, on account of its slow motion, it would effect the object which Prof. Wilson had so well described—the perfect cultivation of the soil. Cultivated land was not like a common road. An engine on common road was designed to move at a rapid rate, and its tendency was of course to destroy the road—an effect which it was desirable to prevent as far as possible. But in agricultural operations the very thing they wanted to do was to destroy the land, and break up the soil; and the very act of getting a leverage on the soil was a means of propulsion, provided only there was the requisite power in the engine. He was not in a position to state which would be best; but it struck him, if they could get the engine to go with the plough, that that would be by far the best way.

A **Member**: You will never do that.

Mr. **Williams**: Never.

Mr. **Mechi**: It had been done in the case of Mr. Usher, for he had not only ploughed his land, but his engine had come back over the same land, and ploughed it again. That experiment had been well recorded, and a long paper speaking favourably of it had been read by Professor Wilson, who now occupied the chair of agriculture in Edinburgh. Mr. Usher was, he understood, to appear at Carlisle next July, and he wished him success, for that gentleman had spent a good deal of money upon his experiments; and if it were necessary, he (Mr. Mechi) should be glad to contribute towards forwarding the model to the show. One very useful invention he observed on Lord Willoughby D'Eresby's farm. Finding that his chains almost always broke from the concussion of iron with iron, his lordship provided a remedy by the introduction of a thick collar of vulcanised Indian rubber, which acted as a spring, received the blows, and enabled the operation to be performed satisfactorily. He also saw there two portable steam-engines, which were better than any he had ever seen exhibited at the agricultural shows. These were made at the works of the Great Western Railway, and on the true principle of economising fuel. The steam was cut off at a third. They had three pistons and cylinders; were used expansively; worked at high pressure, 80lbs. to the inch; and altogether consumed much less fuel, with a far greater power, than any he had ever seen at the Royal Agricultural Shows. One of them had eight vertical saws cutting through an immense log of elm, which was at least three feet in diameter. He expected to have seen a large engine; but, to his astonishment, found that it was the portable engine from California, which gentlemen might have observed at the Great Exhibition of 1851. With regard to fixed engines, he knew not what might ultimately be done by them. At the extensive manufactory of Mr. Salt, in the neighbourhood of Leeds, the extent of shafting would reach two inches; which proved that the time might come when the small amount of friction which arose from fixed shafting might carry the farmers' ideas much further than they had yet gone upon the subject of working by means of steam-power. The friction arising from shafting was very small when properly attended to, and as 640 square acres were only a square mile, if the farmery were placed in the middle of that farm, then the extremities of the farm would be only half a mile distant; thus it became a question of importance to what extent shafting or pulleys with fixed engines might be used for the purposes of cultivation (Hear, hear). Lord W. D'Eresby had certainly succeeded in ploughing the land, where it was level, at an economical rate.

Mr. R. **Baker** thought the subject was one which hardly came within the province of farmers; but it struck him that there were difficulties in applying steam to agricultural purposes that did not present themselves in applying it to any other processes. The farmer would have to employ steam-power upon a certain space for only a limited time; there must, therefore, be a constant repetition of moving and adjusting that power, and this was the most difficult part of the matter. If ever it was accomplished, it must be by some mode of applying the power to move the engine readily to the point whence it was to operate. He had never thought it desirable that the steam-engine should operate over a very large space of land at one time; but rather that it should be kept to a certain limit, within which it would work with advantage: consequently a large enclosure would require to be worked in portions, rather than in the whole of its extent at once. In that case the engine ought to move in a transverse direction across the field on a tramway; the rails to be so arranged that they might be taken up and laid down again as the engine was moved forward. Where great resistance was offered, a slow action was obviously preferable. For instance, the cutting of iron was, to a certain degree, analogous to the operation of cutting a stiff and tenacious soil to any depth. The application of the power should therefore be slow and continuous; and, in his opinion, it would be more advantageous in point of utility and advantage, that the engine, when fixed, should move a large number of cutting implements or ploughs slowly, than that it should work quickly, and move a plough at an accelerated rate. Mr. Williams's plan, as he saw it at the Smithfield Show, with three ploughs in continuous succession, seemed to be a step in the right direction. An engine that would move three ploughs at once would move six, nine, or twelve, provided only the power employed was sufficient. Thus, when once the engine was fixed it would accomplish a great deal of work without the necessity of removal; but the motive power must be contrary to that which was produced in a locomotive engine. The latter was made for the purpose of propelling itself in a straight direction. The operations of an engine used for cultivating the land must be in an opposite direction from that which the engine would be propelled, so that to move it on the tramway must be effected by horse power, or a power independent of the engine itself. When he saw the various processes that were accomplished by steam in large manufactories, he could not imagine that the mere turning over the land six or eight inches in depth presented insuperable mechanical difficulties. If there were a mechanical difficulty at all, it was simply in the placing of the engines. The main object to be attained was economy, and if the engine could not be placed so as to plough the land at a cheaper rate than with horses, there would be no benefit, because, setting aside the operations of the spade, there was no system by which the land could be cultivated so well as by the plough and its adjuncts. Throughout a long period the plough had undergone great improvements, and it must take a long time to produce a steam-engine which would do the work better and at a cheaper rate than the plough. The chief result he anticipated from the present discussion was that the hints which were dropped as to the sort of article required might be seized and acted upon by the mechanic; bearing in mind that the great object to be attained was economy, and that, if they could not produce a steam power to plough the land at a far less cost than the keep of horses, anything else would be useless (Hear, hear).

Mr. **Moore** said, the greatest portion of the expense of producing food in this country was the keep of horses; and if the cultivation of the soil could be carried on without that expense, the agriculturists of England would be able to compete successfully with foreign produce. The difficulties in the way of using the locomotive engine were the weight of the engine itself, the weight of the water, and the weight of the fuel. These exhausted the power of the engine so as to counteract in a great measure its efficiency for cultivation; but he believed the time was not far distant when a stationary engine on any part of a farm might be made to transmit its power to any field on the farm with precision and economy.

Mr. J. **Howard** (Bedford) regretted being called upon, as he had not intended to take any part in this discussion. He came for information, and to learn the "doom of the plough"—at least, so far as the implements now in use are concerned; but he confessed that he was as much as ever in the dark as to how the cultivation of the land can be effected by steam-power, that is, as to how it can be done economically and efficiently; for there is no engineering impossibility in the way. Any sanguine gentleman may have 100 acres, or any quantity, ploughed by steam if he will only pay for it. Engineers could be found also, if an order were given and payment guaranteed, who would soon accomplish the work. There could be no question as to the desirability of employing steam-power to the tillage of the land, and any practical method of applying this powerful agent would be the greatest boon to agriculture; but as to the mode of doing so, at present, we appeared to be totally in the dark. Mr. Mechi has alluded to the success of Lord Willoughby D'Eresby's experiments in steam-ploughing, and, lest the public should be misled by the statements made to-night, he (Mr. Howard) would just say, that he had seen the plough operation at Lord Willoughby's, and the club would judge of the "success" when they heard, that to plough four acres per day required two portable steam-engines with double cylinders of 26 or 28-horse power each, six men, and a horse and cart to fetch water and fuel. With all these to pay for, it was difficult to conceive how the cost of ploughing could be so little as that quoted this evening; he himself had made a calculation at the time, that the expense was more than a pound per acre. This calculation was based upon four acres per day, which, he was told, was about the quantity that could be done if no breakages occurred; and accidents, he learned, were the rule, and not the exception. He should not have alluded to this subject had it not been put forward as a successful experiment, and hoped his remarks would not discourage Mr. Williams in his praiseworthy attempts. He was not one of those who thought it improbable that steam would be brought to bear upon the cultivation of the land; on the contrary, he believed its application was merely a matter of time, and that sooner or later it would be accomplished.

Mr. **Mechi**: There must be some mistake about what you say as to Lord Willoughby D'Eresby's farm, for Mr. Williams has read a report from Mr. Scott, his intelligent manager, which states the exact cost per acre.

Mr. **Williams**: Yes, that it was less than 9s. an acre.

Mr. **Mechi** had asked the man who was driving one of the engines, and he stated that it was 8s. an acre; and certainly the engines could not have been of 28-horse power.

Mr. **Howard** knew that they were double cylinder engines of 28-horse power each, manufactured by Couch.

Mr. **Williams**: They were described to me as 28-horse power.

Mr. **Howard** would leave the meeting to judge, then, whether two 28-horse power engines could be driven for 8s. a day.

Mr. **Mechi**: That depends very much upon how they are driven.

Mr. **Howard** had made a calculation, and, sinking the interest on the money, had come to the conclusion that the cost was, at least, £1 per acre.

Mr. **Bradshaw** said that all mechanics would tell them that the fixed engine was the best machine. He himself made use of it, and was daily and hourly watching its operations. In thrashing his corn he never speculated, but thrashed it as it was wanted; and he could thrash out thirty quarters in a forenoon, cut the chaff in the afternoon, and grind until ten o'clock at night, at a very moderate expense. He did not mean to throw cold water upon the application of the steam-engine to the ploughing of the land, but he was not prepared to detract from the advantages of the plough, and give greater credit to the cultivation by steam. Under the improved system in operation on his farm, he made use of the plough very little; and by adopting that system, they might plough in the autumn nine or ten inches deep with one of Busby's, Howard's, or Ransome's large ploughs, and they would not want to touch the land again. The ploughing on the land was a very small portion of the cultivation. Last autumn he ploughed his land, and it required nothing more than the roller and the harrow.

Mr. **Spearing** said that in discussing the applicability of steam-power to agricultural purposes, they should carefully bear in mind the expense at which it was to be worked (Hear, hear). In the case of light land, he could not conceive that ploughing by steam could be done at much less cost than ploughing with horse power. He would suppose that he had to plough an acre of light land with horse power. The keep of two horses, at 1s. 9d. a day, would of course be 3s. 6d.; and one man, whose wages were 1s. or 1s. 2d. a day, would plough the acre within the day. This gave an expense of from 4s. 6d. to 5s. an acre. Mr. Williams, indeed, reckoned that there was a loss of £5 a year on a horse. He, on the other hand, contended that under good management no such loss would be incurred; and keeping in view the question of profit, he was inclined to rest contented with horse-power.

Mr. **Thomas** thought great credit was due to Mr. Williams for the untiring energy which he had displayed with regard to this subject. With respect to the relative advantages of fixed or portable engines for barn work, he had supposed that two years ago the club were almost unanimously of opinion that for all such work fixed engines were by far the most economical. The reports from East Lothian, which was always looked upon as a model farming district, all supported that view; and Lord Kinnaird, in a valuable paper which he had sent to the Royal Agricultural Society, had, he thought, expressed a similar opinion. He (Mr. Thomas) hoped they would never get into the habit of using portable pig-styes, and similar contrivances; and, indeed, if such a practice were to prevail, what would be the use of asking landlords to build good homesteads? (Hear, hear). If the plan proposed by Mr. Williams were the most profitable one, there would be no need of farm-buildings. With regard to the application of steam power to ploughing, he was inclined to leave that matter at present to Mr. Williams, who appeared sanguine as to the result; and the more so because in a paper which he introduced some time ago, having reference to the employment of farm-labourers, he observed that the best mode of promoting their employment was, not to wriggle along on the old jog-trot system, but to aim at introducing improvements, in order that there might be as large a growth of corn as possible, and that it might be disposed of to the public at a cheap rate. Therefore, he heartily wished Mr. Williams success. He believed that, in the calculations which he made with regard to the expense of horses, he was rather under than over the mark. There was no part of his expenditure which he paid so unwillingly as that which was connected with the keep of his horses. Every shilling expended upon horses for work that could be done as cheaply by steam was lost to the country. It might, he thought, be laid down as an axiom that whatever could be done as well and as cheaply by horses as by men, should be done by horses; but that, if it could be done equally well and cheaper by steam, it should in that case be done by steam.

Mr. **Williams**, in reply, said some disappointment had been expressed because he had not brought with him a model of his steam plough. The explanation was, that he had only taken out his patent that day, and that he should have exhibited some want of caution had he displayed its properties so early (laughter). He had long been convinced that if ever such an invention was to be brought to bear practically, it was more likely to be done by a farmer than by an engineer. In dealing with the matter, he had laid down three problems for his own solution—first, could he do the thing at all? secondly, could he do it well? thirdly, could he do it profitably? and on each point he was ultimately satisfied. He believed that with six-horse power he should be able to draw from four to six ploughs at the depth at which ploughing was done in his own neighbourhood. It was not the power itself, but the application of it, which had hitherto been the great difficulty; and it was in his mode of applying the power that he placed his hopes of success. When he had brought the machine into operation he would take care to make it public, and such was its simplicy that he thought it might be practically applied to all kinds of soil, a certain degree of inclination being an advantage. As regarded Mr. Thomas's objection to portable pig-styes and similar contrivances, namely, that such things would prevent landlords from erecting proper homesteads, he would simply remark that what he aimed at was simply to provide for cases in which landlords failed to meet the just requirements of their tenants in that respect.

On the motion of Mr. J. Payne, seconded by Mr. Mechi, it was resolved,

> "That this meeting expresses its conviction of the benefits that would accrue to agriculture by the introduction of any invention by which the land of this country could be economically and efficiently cultivated by steam-power; but at present the club is not sufficiently informed upon the subject to recommend any particular method."

The meeting terminated with a vote of thanks to Mr. Williams, and a similar compliment to the chairman.

CUMBERED GROUND.

FRUIT AND FLOWERS.

The adult class usually closed its labours in March, for the summer months; but whenever he could manage it, Mr. S. kept up his influence with its members, and particularly with the lads, and such as were of unstable character. From some he was too distant to have any intercourse during the long recess; but he accustomed himself to look in, from time to time, at the cottages of such as were within reach. He would correct a sum here, he would explain a passage there; everywhere he would stimulate his scholars to persevere, putting before them, when apt to be discouraged, the bright examples of many of the greatest men who now adorn the highest offices of trust in the kingdom. Nor did he stop here. Many of the poor take a pride in their gardens; and he often supplied flower-seeds and roots from his own, or gave them new notions about the improved methods of cultivating vegetables. The garden inspection often gave opportunities for talking with the parents about the training of their children, the conduct of the household, and a multitude of small matters in which Mr. S. could give good and practical advice. Many a poor fellow—burdened by debt contracted during family sickness, or accident, &c., which had hung like a dead weight upon him, depressing his spirits for years—has unbosomed his distress to my friend, and found in him a true sympathiser. In some cases he has become simply the banker of such a one, taking charge of a weekly shilling; or he has perhaps, now and then, in cases of great distress, put a shilling to every five or ten placed in his hands. But he has told me that he did not often relieve in this latter way, namely, with money. He objected to it on principle. He was not amongst those who so lowly esteem the poor as to say they care only for what they can get. And have you ever, good reader, considered the distinction that exists between the *material* of benevolence and the *morale* of benevolence? If *you* cannot discover it, the *recipients* of your charity are not at a loss to discern your motive, or to put a just value on your gift. Try a copious distribution of the *material* against the simple *affection* of benevolence, and see under which system you will be most sincerely welcomed to the cottages of the poor. However much the passion for gold and silver has increased, and does pervade our world, still the charm of simple kindness—even where it has nothing to bestow but a soothing word—is not unfelt; and good-will, though unaccompanied by wealth, can spread a higher and more permanent *felicity* amongst the poorest vicinities than ever wealth can, in all its profusion, unaccompanied with good-will.

Well, this kindly interchange of feeling between Mr. S. and his cottagers increased his influence, and constituted him, in time, the centre of attraction to the sphere in which he moved.

About this period, he established a *cricket club.* All parties entered into the proposal *very readily;* they subscribed for a ball, bats, and wickets, according to their means. A spot of level ground in one of the pastures was assigned for their use; this was rolled down, and a committee of management was chosen to superintend the sport. At first there was only one club, playing four evenings a week; but subsequently the boys separated from the adults, and played on alternate evenings, so that the ground was always in use. This recreation became exceedingly popular; it tended to keep many young men and boys from vicious pursuits they would otherwise have followed, and it brought many additions to the adult school, for this club was confined to the members of the school. Grand matches were played between these two rival parties in time; and each on the winning side received a book with his score written beneath his name on the fly-leaf.

Mr. S., as frequently as he could, used to play with the men, and to him I am indebted for some remarks upon the effects of this part of his system upon those concerned. "We hear a good deal," said he, "about the necessity of cultivating a kindly feeling between employers and employed; but how is this to be effected unless the employer goes out of his way to encourage it? Master and man are both too busy during the hours of business to have time for gossiping, and after their work is done the men go to their homes, and would see and know no more of their master till the next day, did he not design otherwise. Now, this simple and innocent expedient of the cricket club has brought me into close contact with many a young man I should never else have known, and with whom I am upon terms of true and deep personal friendship." "Once," said Mr. S., on another occasion—"once get well thrown in with them, with a conviction on their part that you are thoroughly in earnest in wishing their good, and the better educated and more formed mind is quite certain to get very great influence for good over the less educated and less formed one; and this influence once obtained goes on working almost unconsciously to the person exercising it—except in its effects."

The problem that has posed many well-intentioned masters—I mean, how to be on a friendly footing with their workpeople, and yet preserve the natural and necessary distinction between master and servant—was happily solved by Mr. S. The spirit of community was generated, and the manners of both men and boys were softened and refined by his presence and courteous bearing.

The good old English game of cricket introduced a heartiness of feeling amongst those so employed, and a very cordial respect towards my friend. Besides a strength and activity of body, a quickness of hand and eye, were instilled by it into an otherwise gloomy and stolid set of fellows—qualities that any employer of labour would prize in his men as a mine of wealth, both to them and to himself. And those little prize books presented to the members of the winning side, were a link in the chain. Gained as they were, they were better appreciated than had they been mere gifts; and being generally above the capacities of their owners they acted as grand inducements to perseverance. He who had dexterity enough to win a prize, must have courage and perseverance enough to master its contents. For very shame he must learn to read it.

Thus the men and boys were made to feel that the cricket was but a part and parcel of the same system with the winter's hard schooling. The whole affair, in fact, worked admirably; but I really must leave some points in this narrative to the imagination of my readers.

The cricket club increased the school—the school qualified the enthusiasm for play—a cheerful spirit for work was abroad—the sneer for "the visionary schemer" was changed to the desire to derive credit from even a better-late-than-never alliance with the successful scheme—the stout opposers of all suspected of "cant" laid by their cudgels, and looked on—the "Tom and Jerry" keepers grumbled, and some sold up, and budged to where the "wanity of taps might still be fashionable!" A marked change had come, in fact, over the village of K—— and its neighbourhood, a change that elicited a letter from a gentleman who visited it about this time, after an absence of ten years, and from which the following is an extract:—"Would sir, that your example were not so isolated! Would that it were witnessed by some thousands, rather than by a few hundreds! I should be happy if our factories could adopt the system of reciprocal interest, respect, and fellow-feeling, you have so happily established at K——. Then might we look with pride and pleasure, and safety too, to the extension of the elective franchise. For our working men would scorn with pride the indignity of the proffered bribe, and abash the titled briber who might seek to buy with gold the invaluable privilege, purchased for them by their ancestors at the price of their life-blood. Yours, sir, independently of its high social benefits, is a moral training for ensuring a right use of political power in the hands of a multitude of freemen."

REALIZATION.

Towards the close of the second winter I received the following letter from my friend Mr. S., of which I am at liberty to make use.

"This cumbered plot of ground is beginning to afford encouraging proof that the labour invested, and the seed dropped, have not been in vain. I have been here but three years, and have really done very little, but the manifest change amazes me. It is not, perhaps, so much the present results at which I look with surprise, but the abundant harvest of good foreshadowed by them. To me, however, these present results are a sufficient reward. My own men are abandoning their old ways: they are coming to experience and appreciate the true bliss of domestic life; they are spending their evenings with their families, improving themselves and their children by the means I have thrown in their way. An intelligent labourer is becoming the rule—a dolt the exception. Their dress bespeaks a better state of things; and an oath, or an instance of intoxication, is a thing I have not heard of these two years: and if this influence spreads and deepens, who can speak without emotion of the ultimate result! When I looked upon this moral wilderness—and I am sure that missionaries were as much needed here as ever they have been in the Pacific —I confess that I was sick at heart. But we are ridding ourselves of weeds, not indigenous, and those deep-striking, noduled roots—bad habits—that at times turned the fine edge of our patience, and baffled all our efforts Thanks be to Him, however, who has said that 'the wilderness shall blossom as the rose,' for we recognise His hand in our success.

"That decided 'hit,' as an enterprising tradesman would term the cricket club, brought so many fresh applicants desirous of admission to what I may call our little society, that I looked with dismay upon the amount of work for which I became responsible during the winter. Curiously enough, help arrived at a time and from a quarter I least expected it. A young gentleman entered my family for the purpose of learning the business; and he expressed himself so interested in my project that I asked him to assist me. He most obligingly assented. He has received a sound education, and is apt to teach; altogether, I could not have found a better colleague. This seasonable addition to my strength makes it possible to open what you facetiously called 'the shooting gallery,' four, instead of two evenings a week.

"You, I know, admire the fine spirit of our friend the carpenter: his school is deservedly popular amongst the chubby-cheeked rogues. The opening night might very well be designated, as some other opening nights are, 'a crush:' one little urchin termed it 'a jolly squash.' I go in sometimes, to advise with and encourage the master, and say a kind word to the boys. It does one's heart good to see the little rascals. 'Give me these lads,' said a gentleman from Australia, the other day; 'bless the boys! I love to see them with their fearless open eye, their sturdy, roguish strut, and their broad backs. There's a mine of wealth in each one of these fellows. O, sir! I've seen the children of other nations with their feeble limbs, dejected spirit, and hang-dog look; but here's the stuff to make a nation!' Well said, was it not? *stuff to make a nation!* And you and I, my friend, are well set to work up this stuff into something commensurate with the splendour of our times and the present pressing necessities of our beloved country.

"But you will be wishing to know whether, the number of evenings being now doubled, the educational course has been changed, and how. The following table exhibits the plan we have adopted this winter:—

Time.	Monday.	Tuesday.	Thursday.	Friday.
From 7 till 8	Reading	Reading	Reading	Lesson on Common Things."
8 till 9	Writing	Arithmetic	Dictation	

For the sake of those readers who desire "to go and do likewise," I will give a few of Mr. S.'s practical remarks upon this plan, at the hazard of being thought tedious by some who may take more interest in the bovine or canine species than in the human kind.

"I have to tell you that the History of England has its place as a reading-book. I have a large map of Great Britain hung up, and we read the history with a constant reference to the geography of England; and these two branches of knowledge are pleasantly acquired together. The circumstance illuminates the locality, while the locality affords a recognised home to the circumstance. The eye and the memory are thus valuable associates; they stimulate and substantiate each other. These exercises are welcomed by the men, and all parties vastly approve the lively cross-fire of question and answer at the close of the lesson. Then you will want to know about 'Dictation.' This is a new device, by which history, spelling, composition, and writing are taught in one exercise. Those circumstances that have mainly founded and nurtured the national character of England, I have collated, arranged, and set forth as simply and strikingly as I could, and from this little epitome I dictate several sentences every Thursday evening. Every word is clearly pronounced, and the writers, guided by sound, instinct, or previous knowledge, place it upon their slates. When a sentence is finished, it is displayed upon the black board, and by it they correct any errors into which they may have fallen. This was slow work at first; but practice soon gave facility. I have arranged this matter into question and answer, and when they go home, I rub every answer from their slates, leaving them the questions; the reply to which must be furnished at leisure, by memory, and brought to me for correction, and it is wonderful how well their retentive faculties serve them. When I have passed it, it is entered during their spare time, with pen and ink, into a ruled copy-book, and, in time, again passes under my eye. This exercise is excessively popular, and the men's progress proves that it is very efficient.

"Now as to the lesson on Common Things. Sometimes it is given by my young colleague, and sometimes by myself. You will perhaps like a specimen of one of these conversational lectures: it will be in outline.

"THE SOURCES OF DOMESTIC HEALTH AND COMFORT.

"1. *With regard to food.*—The value of different kinds of food, both vegetable and animal; those best adapted to supply strength and heat respectively to the human frame; how to mix various sorts of nutritious food cheaply; those fitted for hard muscular exertion; and diet for the young and the sick. The method of obtaining a regular succession of crops of vegetables in the cottage garden, without exhausting the soil.

"2. *With regard to cooking.*—The best modes of making common things cheap and palatable; the different modes of boiling beef if soup be required; the relative advantages of boiling, roasting, stewing, and baking; the best forms of fire-places, stoves, ovens, boilers, &c., for domestic use, the baking of bread, &c.

"3. *With regard to the healthy state of a house.*—The cheapest and most effectual mode of draining, ventilating, and warming the houses of the poor; the importance of avoiding all collections of refuse and decaying matter; the connection of the common diseases of the poor, such as rheumatism, fevers, inflammation, and contagious maladies, with the dampness, bad ventilation, want of personal and domestic cleanliness, and the retention of decaying matter in or about their dwelling, and the best means of avoiding these causes of disease.

"4. *With regard to personal health.*

"5. *With regard to domestic comfort.*—The uses of order, neatness, a knowledge of expedients of washing and drying, with the least inconvenience to a family; the economy of soap; the best method of softening hard water; the decency of sleeping arrangements; the proper distribution of wages, with an eye to physical support; education; the savings bank, and the sick club.

"The heads of this lesson were taken from the Dean of Hereford's valuable little work, lately published, entitled 'Suggestive Hints towards improved Secular Instruction.' Much useful information has been conveyed likewise by lectures on 'The Loaf of Bread,' 'The Cottage Fire,' 'The Flame of the Candle.' We have illustrated the contrasts, truth and falsehood, idleness and industry, sobriety and drunkenness, &c.; and our wide margin affords scope for lessons on natural history; those subjects allied to the occupations and distinctive features of the district; natural philosophy, under which head we have already explained the atmosphere as a vehicle of heat and moisture, as a vehicle of sound; rain and clouds, mist and fogs, dew, &c. But you know, as well as I do, the range we possess. Our audiences are very large, very attentive, and most encouraging. There is one circumstance I have failed to mention, as an alteration upon the old plan—we commence with a short prayer for Divine assistance and blessing, overpoweringly convinced that without God's assistance, we can do nothing, and without God's blessing all we do will come to nothing.—Yours, &c."

It may be objected, though I should be surprised, in the 19th century, to hear it said, that this letter should have no place in an agricultural journal. To those who do object, let me say that many large Manufacturing firms, and two Joint Stock Companies, deem it a highly profitable scheme to spend *some thousands annually* in the education of the children, youths, and men they employ; and men of the highest business reputation recognise the principle, not only as a principle of benevolence, *but as a sound principle of trade.* We may speculate upon agricultural improvements; but we are powerless to carry them out, except by means of intelligent workmen. F. R. S.

THE SELECTION AND CULTURE OF MANGOLD-WURTZEL FOR A SEED CROP.

The *Mangold-wurtzel crop* is becoming one of the most common and most valuable of root-crops. The extraordinary weight produced per acre, particularly upon suitable soils: the well-established order of culture, the general management, and subsequent preservation of the roots for consumption, together with the mode, time, and application of them for the uses of the stock, have rendered this crop almost invaluable for farm service. In the past untoward season it has proved of unusual advantage, having kept admirably through the late protracted winter, in every case where it was properly secured in grave; and at this time (April 27th) the crop is now in full course of consumption, to the very manifest benefit of all the kinds of stock to which it is given, but most of all to the ewe flock. It is, therefore, very important not only to have a crop of these roots, but a large one. A considerable breadth ought to be grown on every farm, proportionate to its size. It is also equally important to obtain the seed from a good *stock.* Many varieties are "fangy"—*i. e.,* putting out numerous small roots, which take a strong hold upon the soil, while the mangold itself is also close-grained or hard in its character. The best varieties grow very freely from only one tap-root, surrounded by innumerable fibres; and the mangold is so open and mellow in its nature as frequently to fly into many pieces when pierced by a fork. This denotes its excellent quality; and it is from stocks like these that growers should be careful to select their seed.

Varieties cultivated.—There are four principal varieties of mangold cultivated for food for stock: the Long Red, of which there are several sub-varieties; the Long Yellow; the Red Globe; and the Yellow or Orange Globe. The white variety is seldom grown for food, being chiefly used by sugar-manufacturers. The long varieties are best adapted for, and will produce the greatest weight of food on all deep soils; and the globe varieties are, in like manner, most suited for, and will produce the greatest weight of food on all shallow or thin soils. They are also better keepers than the long sorts.

Selection of Stock for Seed.—The best roots, of approved shape, ought to be chosen for stock plants. The Long Red Bugle variety: These roots should be selected for their gently-curved or long "cow-horn" form, and thick but uniform tapering shaped root throughout, clear deep red skin, a fibrous tap-root, and small top or crown. The common Long Red Mangold should be straight or upright, and in every other respect like the Red Bugle. The Red and Orange Globes should approach somewhat nearer the shape of an egg than a globe, and ought also to possess only a single fibrous tap root, with small crown on top. In each variety, the best attention should be given to those sorts subject to bury themselves least in the ground, or rather, to grow most freely without burying themselves too deeply. Mangolds thrive best in warm, sunny weather, and are generally of the best quality and most abundant when most exposed to such influence.

Soil and Cultivation. — The soil proper for growing selected roots should be deep and fertile. It should be ploughed at least eight inches deep, and should undergo all the requisite workings to bring it into a loose mould of as great depth as possible; and as this has to be done early in the spring, it is often a difficult task. Trench ploughing in the winter is very desirable, to ensure the full accomplishment of this unusual farm operation. It may thus be readily reduced to its requisite tilth; and the setting out of the roots should immediately follow.

The period for planting or setting will vary according to the season; but it should take place as soon as possible in the early spring, when it may reasonably be expected that no danger will arise from frosts sufficiently severe to injure the crown.

The setting out may either be done by the *spade* or *plough*. In setting by aid of the plough, it is customary to set out a ridge as for potatoes, and to place the roots nearly upright on each side the ridge, and at regular distances according to the size of the roots selected for setting: the larger the root the more room it requires. The roots should average about a foot in length, and six inches in circumference, for the long sort, and a similar proportionate size for the globe kinds, and the distance apart may then average about twenty inches. This size is sufficiently large for all useful purposes, and better than larger ones for ensuring a good crop. As the ploughing proceeds, it covers the roots to the crown: every second furrow will require a fresh supply of roots to be covered by the earth being ploughed upon them; and care should be taken to see that the earth is properly closed in upon every root, neither leaving it too exposed nor too highly covered. This must be done with the spade by an attendant following after the plough, and treading where requisite, which is the readiest way of setting; but the mode is not so good as by the spade. In setting with the spade, it is usual to set by line. The setter makes a hole large enough to contain the root. This is placed in it by an attendant lad. He then makes his next hole, and with the earth from it he fills up the preceding one; and thus the setting proceeds throughout the field.

The most common mode of procuring a crop of mangold seed is to prepare the soil in August or September, and drill in the seed. The plants being young and small, and in great abundance, a sufficient number will generally abide the winter to stand for the crop. This plan is by no means equal to the due selection of the roots, to keep up the permanent stock, as only the hardiest and least nutritive plants remain. The crop is not a winter crop; and it is not cultivated for its hardihood, but for its great produce and nutritive value.

Another mode of procuring a crop is by transplanting plants of small size, raised in a seed-bed or plot; or the smallest roots from the store or grave. There can be no great objection to this plan, and it is cheap and readily effected; and much good food is thereby saved. The greatest care should, however, be taken to sow seed from a most approved selection or stock.

The subsequent culture will merely consist of a good and deep hoeing, weeding, &c., as often as required; and strict attention to the trumpeters—*i. e.*, roots running away too early to seed. These should have their tops nipped off, that the whole crop may be kept even and regular, so as to attain maturity at the same time.

Harvesting.—The crop will generally be ripe about the time of harvest, and its ripeness is known by the bottom seeds on the stalks being ready to fall off on being shaken, while at the same time the top seeds may not have lost their greenness or are just turning to the desired dull buff colour. In this state it may with safety be cut, as these topmost seeds will for the most part ripen on the down-lying stalks. If not cut before the topmost seeds are fully ripe, great loss will ensue from the falling off, or shedding of the bottom seeds. The crop should be cut into such ordinary-sized reaps as appear best calculated to promote speedy drying, and good facilities for taking up and carrying either to the stack or thrashing-cloth. It is, when well dried in reap, one of the worst of seed crops to lead. The ungainliness of the reap or half-sheaf, which will not weld or compress together, so as to allow lifting in mass, and the loose or fickle hold of the seed to the stems, which fall upon being slightly touched, render this a difficult operation, and require the greatest care.

The stacking should be done after the mode lately described for stacking mustard and turnip seed. It is best to be stacked in an unfavourable season, as it will dry much afterwards. The great objection to this course is the astonishing injury it will be subject to from mice. No crop is more damaged by mice than the mangold seed crop. (The writer of this paper once had the seeds of three stacks entirely spoilt by their depredations during one winter: not a pound of seed was saleable.) They do great damage when the seed is thrashed and in bulk, but by no means so bad as in stack.

The thrashing should take place as soon as the seed is really dry; and is best thrashed out from the reap after the method described in my late paper on turnip seed. The dressing is a somewhat difficult task. My own practice is to use sieves with large meshes in the first stage, dressed by aid of wind; and to thoroughly clean it by the operation of *reeing* with a fine-meshed sieve. If dry, it will keep for several years in a good growing condition. The produce is large from a good crop; but it is very precarious, depending much upon the season. P. F.

ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

A Special Monthly Council (after the Easter Recess) was held on Wednesday, the 18th of April. The following Members of Council and Governors of the Society were present:—Mr. Miles, M.P., President, in the Chair; Lord Berners, Lord Southampton, Hon. A. Leslie Melville, Sir John Villiers Shelley, Bart., M.P., Sir John V. B. Johnstone, Bart., M.P., Sir Archibald Keppel Macdonald, Bart., Mr. Raymond Barker, Mr. Barnett, Mr. Barthropp, Mr. Blount, Mr. Cavendish, Colonel Challoner, Mr. Evelyn Denison, M.P., Mr. Foley, M.P., Mr. Gadesden, Mr. Garrett, Mr. Brandreth Gibbs, Mr. Fisher Hobbs, Mr. Hoskyns, Mr. Hudson (Castleacre), Mr. Kinder, Mr. Lawrence, Mr. Sillifant, Professor Simonds, Mr. Slaney, Mr. Turner (Barton), Professor Way, Mr. Jonas Webb, and Mr. Woodward.

The following new members were elected:—

Alderson, John, Thornby Villa, Wigton, Cumberland
Badham, George, Beckford, Tewkesbury, Glouc.
Brown, George, Woodthorpe, Alford, Lincolnshire
Clarke, James, Carlisle
Cookson, John, Meldon Park, Morpeth, Northumberland
Cooper, Arthur L., Witcombe, Dorchester, Dorset
Fletcher, John Wilson, Graysouthern, Cockermouth
Fowler, Richard, Broughton Grounds, Aylesbury
Gauntlett, William Henry, Banbury, Oxon
Hales, Edward, 11, Westbourne Crescent, Hyde Park
Harrison, Daniel, Singleton Park, Kendal
Harvey, Richard, Greenaway, Torquay, Devon
Hill, Charles, 25, Hyde Park Square, London
Hope, Joseph, Whoof House, Carlisle
Hunter, William B., The Haugh, Kirkliston, Linlithgowshire
Jackson, Thomas, jun., Great Maplestead, Halstead, Essex
Johnson, Edward, Flookersbrook Foundry, Chester
Johnston, Bryan, Flookersbrook Foundry, Chester
Jones, John, Wardle Hall, Tarporley, Cheshire
Keyes, Henry James, Ashingdon, Rochford, Essex
Marchant, Robert, Abbes Farm, Hurstperpoint, Sussex
Matthews, F., jun., Driffield, Yorkshire
Maxwell, Wellwood, Munches, Dalbeattie, N.B.
Mellish, Nicholas, Guernsey
Mumford, William, Credehill, Hereford
Perry, William, Alder House, Thrushelton, Okehampton, Devonshire.
Pugh, William R., Hillfield House, Bewdley, Worc.
Reay, 20, Gloucester Gardens, Hyde Park
Sainsbury, George, The Priory, Corsham, Chippenham
Warner, Thomas, 47, Sussex-square, Brighton
Wood, Charles, Rivenhall Place, Witham, Essex

Finances.—Mr. Raymond Barker, Chairman of the Finance Committee, laid before the Council the monthly report on the accounts of the Society, and the usual quarterly statements for the information of the members. He also reported the current cash-balance in the hands of the bankers as £3,239.

Prize-Essay.—The President reported from the Journal Committee the following awards already made by the Judges of Essays and Reports:

I. To Clare Sewell Read, of Plumstead, near Norwich: the Prize of Fifty Sovereigns, for the best Report on the Farming of Buckinghamshire.
II. To Henry Evershead, of Albury, near Guildford: the Prize of Fifty Sovereigns, for the best Report on the Farming of Warwickshire.
III. To John Coleman, of Deene, near Wansford, Northamptonshire: the Prize of Forty Sovereigns, for the best Essay on the Causes of Fertility and Barrenness in Soils, so far as observation and science have hitherto enabled them to be ascertained.
IV. To Isaac Seaman, Veterinary Surgeon, Saffron Walden, Essex: the Prize of Twenty Sovereigns, for the best Account of the Nature and Treatment of Lameness in Sheep and Lambs.

The President further reported that the Judges had decided that none of the essays sent in to compete for the prize of £20 for the best Essay on the Prevention of Mildew in Corn Crops, possessed sufficient merit for that prize; that one of the essays in the class of Lameness in Sheep and Lambs was excluded from competition on account of its not having been sent in until after the 1st of March; and that adjudications still remained to be made in five other classes of essays than those in which decisions had been announced.

Guano Supply.—The President reported from the Guano-supply Committee that several communications had been received from the Foreign Office, through Lord Wodehouse, since their previous meeting, containing further information of the discovery of new supplies of guano, and assurances that every means would be taken by the Earl of Clarendon to obtain for the farmers of this country as full a participation in the benefits of such discoveries as might be conceded, by the respective states within whose territories the guano deposits occurred, to the farmers of other countries.

Carlisle Meeting.—Mr. Fisher Hobbs, Vice-Chairman of the General Carlisle Committee, reported the gradual progress of the works for the Carlisle Meeting at the end of July next; and the favourable manner in which the railway companies had received the application of the Council for a renewal of the concessions they had hitherto so liberally granted to the Society's exhibitions in the transit of their live stock and agricultural implements and machinery.

Steam-power Conditions.—Colonel Challoner, Chairman of the Implement Committee, reported the following results connected with inquiries relating to the conditions of the Implement Prize-sheet for the Carlisle Meeting:—

1. Steam-engines worked on the expansive principle will be allowed an expansive valve, worked by a simple excentric, in addition to the ordinary slide-valve, so long as worked under one fixed rate of expansion, and divested of all complicated arrangements intended to vary the rate of expansion.
2. The *true* velocity which each exhibitor of a steam-engine considers best for his particular engine must be stated and adhered to by him in each case—no indefinite varying, or average statement of velocity being allowed.
3. The attention of the Stewards and Judges will hereafter be particularly called to the clause—" That no force-pump must be fitted with more than two valves, which must be of easy access;" and a special note on the same point will be forwarded to the honorary director of the Show.
4. The Society will not undertake to find the *motive power* for working the Steam-cultivators competing for the Society's Prize of £200 at the Carlisle Meeting.

Ages of Pigs.—Mr. Barnett, Chairman of the Age of Pigs' Committee, submitted to the Council the following report (which was also adopted and confirmed):

1. That all pigs exhibited at the Carlisle Meeting shall be subjected to their mouths being examined by the Veterinary Inspector of the Society.
2. That should the state of the dentition of any pig indicate that its age has not been correctly returned in the Certificate, the Stewards shall disqualify such pig, and shall report the circumstance to the next Monthly Council.
3. That Prof. Simonds shall be authorised to call in an assistant if required; but that the Professor shall be responsible for the correctness of the opinions given; and that the remuneration to be paid to such assistant shall this year not exceed ten guineas.

Country Meeting of 1856.—A memorial was received, through Mr. Fisher Hobbs, from Mr. Parker, the chairman of a county meeting held at Chelmsford on the 16th inst., inviting the Society to hold its Country Meeting of 1856 in that town, the centre of a purely agricultural county, which comprises upwards of a million of acres of land and nearly half a million of inhabitants, and where every local circumstance would be found to be most favourable for the promotion of the objects of the Society.—Mr. Raymond Barker and Mr. Brandreth Gibbs were requested to form an Inspecting Committee for the purpose of visiting the proposed localities, and reporting to the next Council on their capabilities for purposes of the country meeting.

Cattle Awards.—On the motion of Mr. Fisher Hobbs, the following resolution was adopted:—" That, in accordance with the resolution passed at the last Council, requiring the judges to give in a reserved number for each class of Live Stock, the judges be instructed to give in such number at the Carlisle Meeting, but only in those cases in which the animal would in their opinion possess sufficient merit for the prize awarded in each class, should the animal to which the prize was awarded become subsequently disqualified."

The Council then adjourned to their weekly meeting at 12 o'clock, on Wednesday, the 25th of April, when Prof. Way would deliver before the members of the Society a lecture on the Influence of the Atmosphere on Vegetation.

Weekly Council, April 25: Mr. Miles, M.P., President, in the chair.

Atmospheric Supply of Manuring Matter.—Professor Way, Consulting Chemist to the Society, delivered a lecture before the members on the recent researches connected with this subject, which he regarded by no means a merely theoretical one, as it might at first seem; but one fraught with the most practical results in reference to agricultural operations. He glanced at the germination of seeds on surfaces containing little or no depth of soil, until rocks and towers became covered with vegetation — to the forests of Western America, where successive scourging crops of tobacco and sugar were required to destroy the accumulated fertility — and to the coal-beds of various countries, which had their origin in vegetable matter; facts which he thought must strike the most unobservant, that the air, producing as it did these vegetable products, must possess something more than a mere inert mixture of elastic fluids. He referred to the advantages derived by real science, though unintentionally, from the labours of the alchemists in their researches for gold and the elixir of life; but especially to the philosophical and more legitimate investigations of Priestley, Bergman, Scheele, Lavoisier, and De Saussure, whose genius in the direction of their experiments on air was only equalled by their candour and diffidence in deducing their results. These researches had first their application to the phenomena of combustion and animal life, and subsequently to those of vegetation. Prof. Way then proceeded to explain the composition of the atmosphere, and the negative character of the nitrogen it contained, as controlling the active chemical nature of the oxygen. He stated that the carbonic acid gas mixed with the atmosphere, though small in proportion to the oxygen and nitrogen, was sufficient in amount to furnish carbon for the constitution of the whole of the coal-fields of the globe. He had nothing to remark, as new, on the watery vapour in the atmosphere. The most interesting subject of consideration at the present time was the occurrence of ammonia and of nitric acid in the air, and the mode in which their presence could be rendered still more available to the purposes of agriculture. He then explained how everything organic required by plants could be furnished by these four most powerful elements of the atmosphere and its aqueous vapour, namely, oxygen, hydrogen, carbon, and nitrogen. He described the recent experiments of M. Boussingault, and also those of M. Ville (splendidly illustrated in a work presented to the Society by the French Government), referring to the views on scientific principles of agriculture just published by Professor Liebig, the deductions of Mr. Pusey, the elaborate reseaches of Mr. Lawes, and the experiments of M. Barral. He alluded to the amount of ammonia in rain-water, dew, and fogs, and to the insufficiency of the methods hitherto employed for ascertaining the proportion of nitric acid in the air. He called attention to the large amount of ammonia constantly taken up by the soil, and washing into the land by rain; and to the great importance, consequently, of exposing the soil in such a manner to atmospheric influence as may best tend to this ammoniacal absorption. Fallowing of land, he remarked, had given way to rotation of crops; but that there was no such thing as such a simple resting as fallowing was supposed to imply in this case, for an alteration of the soil under the influence of oxygen was constantly going on. Every interval even, between one crop and another, was in reality a fallow. Land should be laid up as lightly as possible, for the purpose of its aëration. The working of land, with a view to this abundant aëration, was one important means of improvement. He regarded it as indispensable to the full development of the powers of soil that steam-power should be brought to bear effectively upon its cultivation. The amazing bulk of ammonia locked up in the land itself could not be taken up by plants, and would, therefore, remain in a form unavailable for vegetation, unless the management of soil tended to release such manuring matter, and bring it within the reach of the roots. He had calculated, from data furnished by some rich loamy land of tertiary drift, that the soil within available depths contained ammonia at the rate of one ton (equal to six tons of guano) per acre. This was a stock of wealth which would repay the most active measures being taken for its release and distribution. He then passed on to the subject of green manuring, and to that of draining, and the importance of a free aëration of the soil and increased absorption of ammonia, after the water had been duly carried off.—The Rev. L. Vernon Harcourt referred to the manner in which certain fungi absorbed nitrogen and the phosphates during their growth, and yielded ammonia and phosphates to the soil on their death and decomposition. Professor Way explained the theory of fairy-rings, given by him in the Journal some years ago; and his supposition that the development and expansion of the cells of the fungi attracted their air manure.—Dr. Calvert called attention to the electrical effects produced in the atmosphere by thunder-storms, and to the subsequent rapid vegetation in moorland districts; also to the theory of nitrification in nitre-beds.

On the motion of Mr. Raymond Barker, seconded by Dr. Calvert, the best thanks of the Council were given to Professor Way for the able and interesting lecture he had then delivered. The President, on putting the motion (which was carried unanimously), added his tribute of praise, remarking that nothing could more effectually, he thought, call thinking minds into operation than the science and the researches of the able men whose philosophical labours Professor Way had then brought under the review of the meeting. He delighted, as one of the earliest members of the Society, to witness the successful manner in which practice and science were more nearly approaching each other, for the more secure guidance of practical farmers, and for the benefit generally of the agricultural world.

A MONTHLY COUNCIL was held on Wednesday, the 2nd of May. The following Members of Council and Governors of the Society were present: Mr. MILES, M.P., President, in the Chair, Lord Berners, Lord Walsingham, Lord Southampton, Hon. A. Leslie Melville, Sir Charles Lemon, Bart., M.P., Sir John V. B. Johnstone, Bart., M.P., Sir Archibald Keppel Macdonald, Bart., Sir Robert Price, Bart., M.P., Mr. Raymond Barker, Mr. Barthropp, Mr. Hodgson Barrow, M.P., Mr. Cavendish, Mr. Evelyn Denison, M.P., Mr. Druce, Mr. Gadesden, Mr. Garrett, Mr. Hamond, Mr. Fisher Hobbs, Mr. Hoskyns, Mr. Hudson (Castleacre), Mr. Jonas, Mr. Kinder, Mr. Lawrence, Mr. Wilward, Mr. Mainwaring Paine, Professor Simonds, Mr. Slaney, Mr. Thompson (Kirby Hall), Mr. Turner (Barton), Professor Way, Mr. Jonas Webb, and Mr. Woodward.

Henry Bullock, Esq., of Faulkbourne Hall, near Witham, Essex, was elected a Governor of the Society.

The following new Members were elected:—

Allfrey, Henry Wells, Hemingford House, Stratford-on-Avon.
Anderson, Thomas, Ratcheugh, Alnwick.
Ashton, Solomon, Peter-street, Manchester.
Balfour, David, Balfour Castle, Kirkwall, N. B.
Bell, Thomas, Brampton Town Foot, Cumberland.
Carter, Thomas, Dodmore, Ludlow, Salop.
Coleman, Richard, Chelmsford, Essex.
Evans, Thomas, 27, Victoria street, Pimlico.
Finlay, Alexander J., Castle Toward, Greenock.
Fooks, John, Park-street House, Yeovil, Somerset.
Greening, Benjamin, Church Gates, Manchester.
Hobbins, Samuel, Suton, Louth, Lincolnshire.
Hodgson, Henry, Market Stainton, Wragby.
Jackson, William, Hope Bank, Carlisle.
James, James, Llawhdden, Pembrokeshire.
Leonard, Charles, Castle-Camps, Linton, Combridgeshire.
Parker, James, Springfield, Chelmsford, Essex.
Parsons, Christopher, jun., North-Shoebury Hall, Rochford, Essex.
Portous, Richard, Crosswood, Aberystwith.
Roe, William F., 70, Strand, London.
Schollick, Edward Jones, Aldingham Hall, Ulverstone.
Scratton, Rev. Thomas Scott, Sutton, Rochford.
St. Leger, A. F. Butler, Park Hill, Tickhill, Yorkshire.

FINANCES.—Mr. Raymond Barker, Chairman of the Finance Committee, presented the Monthly Report on the Accounts, from which it appeared that the current cash balance in the hands of the bankers was £3,225.

JOURNAL COMMITTEE.—The President submitted to the Council the Report of the Journal Committee, containing the following recommendations:—

1. The postponement to a subsequent meeting of the further reports made by the Judges of Essays, in their adjudication of prizes for 1855.
2. The postponement, to a Special Council next week, of the report of the Committee on the prizes for essays, to be offered by the Society for 1856.
3. The election of Dr. Edward Hartstein, Professor of Agriculture in the Royal Academy of Poppelsdorf, as an Honorary Member of the Society.
4. The delivery of Professor Way's Lecture on the Production of Butter, on the 16th of May; and his Lecture on the use of Fish as Manure, on the 13th of June: before the Members in the Council Room of the Society, at 12 o'clock on each of those days.

These recommendations were unanimously adopted by the Council.

CHEMICAL COMMITTEE.—Sir John Johnstone presented the report of the Chemical Committee, stating the progress of the researches, undertaken by direction of the committee, and carried on by Professor Way, in his new laboratory, 15, Welbeck Street, Cavendish

Square. This report was adopted, and an order made that the amount of the grant for the year ending the 1st May, should be placed at the disposal of the committee.

Carlisle Meeting.—Mr. Fisher Hobbs presented the Report of the General Carlisle Committee, announcing the arrangement of the programme for that occasion, and its preparation for distribution.

Machinery Conditions.—Mr. Raymond Barker submitted the following recommendations from the Implement Committee, which were adopted :—

1. *Steam engine Pumps.*—That no force-pump be fitted with more than two valves, which must be of easy access. That if two pumps be fitted to the same engine, no more than one be allowed to work at the same time.
2. *Reaping Machines.*—That the Society will find horses for the trial of the reapers, but that exhibitors may, if they think proper, send their own horses for that purpose.

Steward of Implements.—On the motion of Mr. Fisher Hobbs, seconded by Mr. Hamond, Sir Archibald Keppel Macdonald, Bart., was appointed Steward-Elect of Implements for the Carlisle Meeting.

Country Meeting of 1856.—The Report of the Inspection Committee having been read, the Council received a deputation from Chelmsford, consisting of the following gentlemen :—Mr. Burch Western (Chairman of the Essex Local Committee), Mr. D. Waddington, M.P., General Hall, Major Skinner, R.A., Mr. Bullock, Mr. Gurdon Rebow, Mr. Kemble, Mr. Mechi, Mr. Hardcastle, Mr. Round, Mr. Parker, Mr. Batard, and Messrs. Meggy and Chancellor (Secretaries to the Committee), who favoured the Council with their explanations of the various local advantages possessed by the town of Chelmsford for the purposes of the country meeting of the Society. On the motion of Mr. Fisher Hobbs, seconded by Mr. Jonas, Chelmsford was then unanimously decided upon as the place of the country meeting of 1856, subject to the completion of the stipulated engagements, and the usual agreement to be entered into by the authorities of the town with the secretary of the Society.

Country Meeting of 1859.—The Council then proceeded to determine the district of the country meeting four years in advance: and Mr. Wren Hoskyns having alluded to the great increase of transit accommodation, furnished by the gradual completion of the railway system of the country, especially in the county of Warwick, and the other central counties of England, since the Society held its first country meeting at Oxford in 1839, it was carried, on the motion of Mr. Fisher Hobbs, seconded by Mr. Thompson, that the Country Meeting District for 1859 should comprise the counties of Oxford, Warwick, Northampton, and Berks, and be denominated the "Central District."

Soda.—An important communication was received from Lord Wodehouse, on the part of the Earl of Clarendon, in reference to an abundant supply of native carbonate of soda ascertained to exist in South America; and of which specimens, forwarded from the Foreign Office, had been placed in the hands of Prof. Way for analysis.

Adjourned to May 9.

A Special Council was held on Wednesday, the 9th of May. The following Members of Council and Governors of the Society were present: Mr. Miles, M.P., President, in the Chair; Hon. A. Leslie Melville; Sir John V. B. Johnstone, Bart., M.P.; Mr. Raymond Barker; Mr. Brandreth; Mr. Evelyn Denison, M.P.; Mr. Hoskyns, Mr. Sillifant, Mr. Slaney, Mr. Spencer Stanhope, and Mr. Woodward.

Journal.—The President reported from the Journal Committee a schedule of the subjects proposed for the Prize-Essays of next year; and the following recommendation in reference to the editing of the Journal during Mr. Pusey's lamented indisposition: namely—

"That Mr. Thompson be requested to accept the office of Chairman of the Journal Committee, and that Mr. Acland and Mr. Hoskyns be requested to accept the office of Vice-Chairmen: the Editorship of the Journal to be confided to those three gentlemen, with whom the Journal Committee will co operate."

This report was adopted by the Council.

Poultry Steward.—The Hon. and Rev. Stephen Willoughby Lawley, of Escrick Rectory, near York, was requested by the Council to accept the appointment of Steward of the Poultry department at the Carlisle meeting.

A Weekly Council was then held—Mr. Raymond Barker, V.P., in the Chair—Earl of Egmont, Lord Berners, Hon. A. Leslie Melville; Sir Watkin Williams Wynn, Bart, M.P.; Sir John V. B. Johnstone, Bart., M.P; Sir Robert Price, Bart., M.P; Mr. Barugh Almack; Mr. Hodgson Barrow, M.P.; Rev. H. T. Black, Mr. Brandreth, Mr. Bullen, Mr. Corbet, Mr. Deere, Mr. Evelyn Denison, M.P.; Mr. Foley, M.P.; Mr. Gadesden, Mr. Garrett, Mr. Goold, General Hall, M.P.; Mr. Hoskyns, Mr. Cuthbert Johnson, Mr. Matthews, jun.; Mr. Orlebar, Mr. Paine, Mr. Parkins, Mr. Scott, Mr. Sillifant, Prof. Simonds, Mr. Bridgman Simpson, Mr. Slaney, Mr. Spencer Stanhope, Capt. Vyner, Prof. Way, Mr. G. Wood, and Mr. Woodward.

MANAGEMENT OF DAIRY CATTLE.

The following communication was read from Mr. Horsfall, of Burnley Hall, near Otley, Yorkshire.

"Burnley Hall, near Otley, May 5.

"In complying with the request of your honourable Council to supply information regarding my treatment of cows for dairy purposes, it seems pertinent that I should enter into some explanation of the motives and considerations which influence my conduct in this branch of my farm operations. I have found it stated, on authority deserving attention, that store cattle of a fair size, and without other occupation, maintain their weight and condition for a length of time, when supplied daily with 120lbs. of Swedish turnips and a small portion of straw. The experience of the district of Craven, in Yorkshire, where meadow hay is the staple food during winter, shows that such cattle maintain their condition on 1½ stone of meadow hay each per day. These respective quantities of turnips and of hay correspond very closely in their nutritive properties; they contain a very similar amount of albuminous matter, starch, sugar, &c, and also of phosphoric acid. Of oil—an important element, especially for the purpose of which I am treating—the stated supply of meadow hay contains more than that of turnips. If we supply cows in milk of the same size with a like quantity of similar food, they will lose perceptibly in condition. This is easily explained when we find their milk rich in substances which serve for their support when in store condition, and which are shown to be diverted in the secretion of milk. In the neighbourhood of towns where the dairy produce is disposed of in new milk, and where the aim of the dairyman is to produce the greatest quantity, too frequently with but little regard to quality, it is their common practice to purchase in or near calving cows; they pay great attention to the condition of the cow; they will tell you, by the high comparative price they pay for animals well stored with flesh and fat, that condition is as valuable for them as it is for the butcher; they look upon these stores as materials which serve their purpose; they supply food more adapted to induce quantity than quality, and pay but little regard to the maintenance of the condition of the animal. With such treatment, the cow loses in condition during the process of milking, and when no longer profitable, is sold to purchasers in farming districts where food is cheaper, to be fattened or otherwise replenished for the use of the dairy keeper. We thus find a disposition in the cow to apply the aliment of her food to her milk, rather than to lay on flesh or fat; for not only are the elements of her food diverted to this purpose, but to all appearance her accumulated stores of flesh and fat are drawn upon, and converted into components of milk, casein, or butter. It is also probable that a like result will take place in regard to her bones, if a due supply of phosphate be not afforded in her food. As I am differently circumstanced, a considerable portion of my dairy produce being intended for butter, for which poor milk is not adapted, and as I fatten not only my own cows, but purchase others to fatten in addition, my attention was given to devise food for my milch cows, adapted to their maintenance and improvement, and with this view I was led to give attention to the composition of milk. From several analyses I have selected one by Haidlen, which I find in publications of repute. Taking a full yield of milk, 4 gallons per day, which will weigh upwards of 40lbs., this analysis assigns to it of dry material 5.20, of which the proportion, with sufficient accuracy for my purpose, consists of—

	lbs.
Pure casein....................	2.00
Butter........................	1.25
Sugar	1.75
Phosphate of lime ..	.09
Chloride of potassium ..	
And other mineral ingredients ..	.11
	5.20

It appeared an object of importance, and one which called for my particular attention, to afford an ample supply of the elements of food suited to the maintenance and likewise to the produce of the animal, and that, if I omitted to effect this, the result would be imperfect and unsatisfactory. By the use of ordinary farm produce only, I could not hope to accomplish my purpose. Turnips are objectionable on account of their flavour; and I seek to avoid them as food for dairy purposes. I use cabbages, kohl rabi, and mangold wurzel, yet only in moderate quantities. Of meadow hay it would require, beyond the supply necessary for the maintenance of the cow, an addition of fully 20lbs. to supply the casein in a full yield of milk (16 quarts), 40lbs. to supply the oil for the butter, whilst 9lbs. seem adequate for the supply of the phosphoric acid. You cannot, then, induce a cow to consume the quantity of hay requisite for her maintenance, and for the full yield of milk of the quality instanced. Though it is a subject of controversy whether butter is wholly derived from vegetable oil, yet the peculiar adaptation of this oil to the purpose will, I think, be admitted. I had, therefore, to seek assistance from what are usually termed artificial feeding substances and to select such as are rich in albumen, oil, and phosphoric acid, or phosphate of lime; and I was bound also to pay regard to their comparative cost, with a view to profit, which, when farming is followed as a business, is a necessary, and in any circumstances an agreeable accompaniment. I think it will be found that substances peculiarly rich in nitrogenous or other elements have a higher value for special than for general purposes; and it seems to me not improbable that this adaptation of materials characterized by peculiar properties to special purposes has not yet gained the attention to which it is entitled. I have omitted all reference to the heat-supplying elements—starch, sugar, &c. As the materials commonly used as food for cattle contain sufficient of these to effect this object, under exposure to some degree of cold, I have a right to calculate on a less consumption of them as fuel, and consequently a greater surplus for deposit as sugar, and probably also as fat, my stalls being kept during winter at a temperature of nearly 60 deg. I now proceed to describe the means I am using to carry out the purposes which I have sought to explain. My food for milch cows, after having undergone various modifications, has for two seasons consisted of bean-straw, oat-straw, and shells of oats, in equal proportion, rape-cake 5 lbs., and bran 2 lbs. per day for each cow; these materials are blended together, moistened, and well steamed; they are supplied three times, *ad libitum*, per day in a warm state. The attendant is allowed 1 lb to 1¼ lb. per cow, according to circumstances, of bean-meal, which he is charged to give to each cow in proportion to the yield of milk, those in full milk getting 2 lbs. each per day, others but little: it is mixed with the steamed food on its being dealt out separately; when this is eaten up, green food, consisting of cabbages, from October to December, kohl rabi till February, and mangold till grass time. With a view to nicety of flavour, I limit the supply of green food to 30 to 35 lbs. per day for each. After each feed 4 lbs. of meadow hay, or 12 lbs. per day is given to each cow; they are allowed water twice per day to the extent they will drink. As some of these materials are not commonly used as food, I may be allowed some observations on their properties. Bean-straw uncooked is dry and unpalatable; by the process of steaming, it becomes soft and pulpy, emits an agreeable odour, and imparts flavour and relish to the mess. For my information and guidance I obtained an analysis of bean-straw of my own growth, on strong and high-conditioned land: it was cut on the short side of ripeness, but yielding a plump bean. The analysis by Professor Way shows a per-centage of—

Moisture of	14.47
Albuminous matter	16.88
Oil or fatty matter	2.23
Woody fibre	25.84
Starch, gum, &c.	31.63
Mineral matters	9.45
Total	100.00

In albuminous matter, which is especially valuable for milch cows, it has nearly double the proportion contained in meadow hay. Bran also undergoes a great improvement in its flavour by steaming, and it is probably improved in its convertibility as food; it contains about 14 per cent. of albumen, and is peculiarly rich in phosphoric acid, nearly 3 per cent. of its whole substance being of this material. The properties of rape-cake are well known; the published analysis give it a large proportion (nearly 30 per cent.) of albumen; it is rich in phosphate and also in oil. This is of the fluid or elain class of vegetable oils, and it is to its elain property that I call particular attention. Chemistry will assign to this material, which has hitherto been comparatively neglected for feeding, a first place for the purpose of which I am treating. If objection should occur on account of its flavour, I have no difficulty in stating that by the preparation I have described I have quite overcome this. I can easily persuade my cattle (of which 60 to 80 pass through my stalls in a year,) without exception to eat the requisite quantity. Nor is the flavour of the cake in the least perceptible in the milk or butter. During May, my cows are turned out on a rich pasture near the homestead; towards evening they are again housed for the night, when they are supplied with a mess of the steamed mixture and a little hay each morning and evening. During June, when the grasses are better grown, mown grass is given to them instead of hay, and they are also allowed two feeds of steamed mixture. This treatment is continued till October, when they are again wholly housed. The results which I now proceed to relate are derived from observations made with the view of enabling me to understand and regulate my own proceedings. For some years back I have regularly weighed my feeding stock, a practice from which I am enabled to form a more accurate estimate of their doings than I could previously pretend to. In January, 1854, I commenced weighing my milch cows; it has been shown by what I have premised that no accurate estimate can be formed of the effect of the food on the production of milk, without ascertaining its effect on the condition of the cows. I have continued this practice once a month almost without omission up to the date of this. The weighings take place early in the morning, and before the cows are supplied with food; the weights are registered, and the length of time (15 months) during which I have observed this practice enables me to speak with confidence on the results. The cows in full milk yielding 12 to 16 quarts each per day vary but little—some losing, others gaining, slightly; the balance in the month's weighing of this class being rather to gain. It is common for a cow to continue a yield from six to eight months before she gives below 12 quarts per day, at which time she has usually, if not invariably, gained weight. The cows giving less than 12 quarts, and down to 5 quarts per day, are found when free from ailment to gain without exception. This gain, with an average yield of nearly 8 quarts per day, is at the rate of 7lbs. to 8lbs. per week each. My cows in calf I weigh only in the incipient stages, but they gain perceptibly in condition, and consequently in value: they are milked till within four to five weeks previous to calving. I give the weights of three of these, and also of one heifer, which calved in March:—

No.		1854.				1855.				Gain.
			cwt.	qr.	lbs.		cwt.	qr.	lbs.	lbs.
1	Bought, and weighed ..	July.	10	1	20	April	11	3	0	148
2	„ „	„	8	2	10	„	10	2	0	214
3	„ „	„	8	2	0	„	10	0	0	184
4	Heifer, which calved also in March, weighed ..	„	7	0	0	„	9	3	0	300

These observations extend over lengthened periods on the same animals, of from 30 to upwards of 50 weeks; a cow, free from calf and intended for fattening, continues to give milk from 10 months to a year after calving, and is then in a forward state of fatness, requiring but a few weeks to finish her for sale to the butcher. It will thus appear that my endeavours to provide food adapted to the maintenance and improvement of my milch cows are attended with success. On examining the composition of the ordinary food which I have described, straw, roots, and hay, it appears to contain the nutritive properties which are found adequate to the maintenance of the animal; the extra food will supply the albumen for the casein, it is deficient in oil for the butter, whilst it will supply in excess the phosphate of lime for a full yield of milk. If I take the class of cows giving less than 12 quarts per day, and taking also into account a gain of flesh, 7 to 9 lbs. per week, though I reduce the quantity of extra food by giving less of the bean-meal, yet the supply will be more in proportion than with a full yield; the surplus of nitrogen and phosphoric acid, or phosphate of lime, will go to enrich the manure. And here I cannot omit to remark on the satisfaction I derive from the effects of this treatment on the fertility of the land in my occupation. My rich pasture lands are not tending to impoverishment, but to increased fertility; their improvement in condition is apparent. A cow in full milk, giving 16 quarts per day, of the quality analysed by Haidlen, requires, beyond the food necessary for her maintenance, 6 to 8 lbs. per day of substances containing 30 to 25 per cent. of protein. A cow giving on the average 8 quarts per day, with which she gains 7 to 9 lbs. per week, requires 4 to 5 lbs. per day of substances rich in protein beyond the food which is necessary for her maintenance. Experience of fattening gives 2 lbs. per day, or 14 lbs. per week, as what can be attained on an average and for a length of time. If we consider ½ lb. per day as fat, which is not more than probable, there will be 1½ lb. for flesh, which, reckoned as dry material, will be about ⅓ lb.; which is assimilated in increase of fibrine and represents only 1⅓ to 2 lbs. of substances rich in protein beyond what is required for her maintenance. If we examine the effects on the fertility of the land, my milch cows, when on rich pasture, and averaging a yield of nine quarts per day, and reckoning one cow to each acre, will carry off in 20 weeks 25lbs. of nitrogen, equal to 30 of ammonia. The same quantity of milk will carry off 7lbs. of phosphate of lime in 20 weeks from each acre. A fattening animal giving flesh at the rate I have described will carry off about one-third of the nitrogen, equal to about 10lbs. of ammonia, as compared with the milch cow, whilst if full grown it will restore the whole of the phosphate. It is worthy of remark that experience states that rich pastures used for fattening, fully maintain their fertility through a long series of years. If these computations be at all accurate, they tend to show that too little attention has been given to the supply of substances rich in nitrogenous compounds in the food for our milch cows, whilst we have laid too much stress on this property of such substances in food for fattening cattle. They tend also to the inference that in the effects on the fertility of our pastures used for dairy purposes, we derive advantage not only from the phosphate of lime, but also from the gelatine of bones used as manure. On comparing the results from my milch cows fed in summer on rich pasture, and treated at the same time with extra food as I have described, with their treatment on winter food, and whilst wholly housed, and taking into account the yield of milk, and the gain of weight, I find those from stall-feeding fully equal to those from depasture. The cows which I buy as strippers, for fattening, giving little milk, from neighbouring farmers who use ordinary food, turnips with straw or hay, and coming under my treatment, increase their yield of milk, until after a week or two they give two quarts per day more than when they came, and that too of a much richer quality. I sometimes observe in the weekly publications which come under my notice accounts of cows giving large quantities of butter; these are usually, however, extraordinary instances, and not accompanied with other statistical information requisite to their being taken as a guide, and it seldom happens that any allusion is made to the effects of the food on the condition of the animals, without which no accurate estimate can be arrived at. On looking over several treatises to which I have access, I find the following statistics on dairy produce:—Mr. Morton, in his "Cyclopædia of Agriculture," page 621, gives the results of the practice of a Mr. Young, an extensive dairy-keeper in Scotland. The yield of milk per cow is stated at 680 gallons per year; he obtains from 16 quarts of milk, 20 oz., of butter, or for the year, 227lbs. per cow; from 1 gallon of cream 3 lbs. of butter, or 12 oz. per quart. Mr. Young is described as a high feeder; linseed is his chief auxiliary food for milch cows. Professor Johnstone, "Elements of Agricultural Chemistry," gives the proportion of butter from 16 quarts of milk at 1½ oz. per quart, or from 16 quarts 24 oz., the produce of four cows of different breeds—Alderney, Devon, and Ayrshire—on pasture, and in the height of the summer season. On other four cows of the Ayrshire breed he gives the proportion of butter from 16 quarts as 16 oz., being 1 oz. per quart. These cows were likewise on pasture. The same author states the yield of butter as one-fourth of the weight of cream, or about 9 oz. per quart. Mr. Rawlinson—Journal of the Royal Society, No. 29, vol. i, 1852—gives the produce of 20,110 quarts of milk churned by hand as 1,109 lbs. of butter, being at the rate of fully 14 oz. per 16 quarts of milk; and from 28,156 quarts of milk 1,525 oz. of butter, being from 16 quarts nearly 16¾ oz. of butter. The same author states that the yield of butter derived from five churnings of 15 quarts of cream each is somewhat less than 8 oz. per quart of cream. Dr. Muspratt, in his work on the "Chemistry of Arts and Manufactures," which is in the course of publication, gives the yield of butter from a cow per year in Holstein and Lunenberg at 100lbs., in England at 160lbs. to 180lbs. The average of butter from a cow in England is stated to be 8 oz. or 9 oz. per day, which on a yield of 8 to 9 quarts is 1 oz. per quart, or for 16 quarts 16 oz. The quantity of butter derived from cream is stated as one-fourth, which is equal to about 9 oz. per quart. The richest cream of which I find any record is that brought to the Royal Society's meeting during the month of July, for the churns which compete for the prize. On referring to the proceedings of several meetings, I find that 14 oz. per quart of cream is accounted a good yield. I have frequently tested the yield of butter from a given quantity of my milk; as my dairy produce is partly disposed of in new milk, partly in butter and old milk, it became a matter of business to ascertain by which mode my dairy produce gave the best return. I may here remark that my dairy practice has been throughout on high feeding, though it has undergone several modifications. My mode of ascertaining the average yield of butter from milk is to measure over the milk from churning day to churning day, and compute the relative proportions. The results have varied from 24 to 27¼ oz. from 16 quarts of milk. I therefore assume in my calculation 16 quarts of milk as yielding a roll (25 ounces) of butter. As I have at times a considerable number of cows bought on as strippers, and fattened as they are milked, which remain sometimes in my state eight or nine months, and yield towards the close but five quarts per day. I am not enabled to state with accuracy and from ascertained data the average yield per year of my cows kept for dairy purposes solely. However, from what occurs at grass-time, when the yield is not increased, and also from the effects of my treatment on cows which I buy, on giving a small quantity, I am fully persuaded that my treatment induces a good yield. I may here observe that I pay great attention to the temperature of my dairy, which I use means of keeping at 52 to 55 deg., my milk being allowed to stand 36 hours. As the yield of butter from a given quantity of cream is not of such particular consequence, I have not given equal attention to ascertain their relative proportions. I have a recollection of having tested this on a former occasion, when I found 14 to 16 oz. per quart; but cannot call to mind under what treatment this took place. On questioning my dairywoman, in December, 1854, as to the proportion of cream and butter, she reported nearly one roll of 25 oz. of butter to one quart of cream. I looked upon this as a mistake. On its accuracy being persisted in, the next churning was carefully observed, with a like proportion. My dairy cows averaged then a low range of milk as to quantity—about nine quarts each per day. Six of them, in a forward state of fatness, were intended to be dried for finishing off in January; but owing to the scarcity and consequent dearness of calving cows, I kept them on in milk till I could purchase cows to replace them, and it was not till February that I had an opportunity of doing so. I then bought four cows within a few days of calving; they were but in inferior condition, and yielded largely of milk. Towards the close of February and March, four of my own dairy cows, in full condition, likewise calved. During March, three of the six which had continued from December were selected by the butcher as fit for his purpose: the other three were dried at the close of March, and are now on hand in a saleable condition. Each churning throughout was carefully observed, with a similar result, varying but little from 25 oz. of butter per quart of cream; on Monday, April 30, 16 quarts of cream having yielded 26 rolls (of 25 oz. each) of butter. Though I use artificial means of raising the temperature of my dairy, by the application of hot water during cold weather, yet, my service-pipes being frozen in February, I was unable to keep up the temperature, and it fell to 45 deg. Still my cream, though slightly affected, was peculiarly rich, yielding 22 oz. of butter per quart. Throughout April the produce of milk from my 15 dairy cows averaged full 160 quarts per day. My cows are bought in the neighbouring markets with a view to their usefulness and profitableness. The breeds of this district have a considerable admixture of the short-horn, which is not noted for the richness of its milk. It will be remarked that during the time these observations have been continued on the proportion of butter from cream, more than one-half of my cows have been changed. Having thus satisfied myself that the peculiar richness of my cream was due only to the treatment of my cows which I have sought to describe, it occurred to me that I ought not to keep it to myself; it appeared to me that these results of my dairy practice afforded matter of interest for the investigation of those who cultivate science, the physiologist and the chemist. Though my pretensions to acquirements in their instructions are but slender, they are such as enable me to acknowledge benefit in seeking to regulate my proceedings by their rules. I was thus led to address the note to Professor Way, whose valuable time I should be careful not to occupy with unworthy matter, suggesting that if he thought proper, he might bring the subject under the notice of your honourable council. In taking off the cream I use an ordinary shallow skimmer of tin perforated with holes, through which any milk gathered in skimming escapes. It requires care to clear the cream, and even with this some streakiness is observable on the surface of the skimmed milk. The milk bowls are of glazed brown earthenware, common in this district; they stand on a base of 6 to 8 inches, and expand at the surface to nearly twice that width. Four to five quarts are contained in each bowl, the depth being 4 to 5 inches at the centre. The churn I use is a small wooden one, worked by hand, on what I suppose to be the America principle. I obtained it from Messrs. Dray and Co. I have forwarded to Professor Way a small sample of butter for analysis; 15 quarts of cream were taken out of the cream jar, and churned at three times in equal portions—

The first 5 quarts of cream gave ..	127	oz. of butter.
The second 5 „ „ ..	125	„
The third 5 „ „ ..	120½	„
	372½	

At a subsequent churning of 14 quarts of cream—

The first seven gave 7 rolls or ..	175	oz. of butter.
The second seven gave 7 rolls 2 oz., or	177	„
	352	oz. „

On testing the comparative yield of butter and of butter-milk, I find 70 per cent. of butter to 30 per cent. of butter-milk, reversing the proportions given in the publications to which I have referred. The churnings usually occupy half-an-hour, at a temperature of 52 deg. Having now, as far as I can recollect, supplied every particular of information, I shall look with interest to the discussion on this subject, which, as I observe from the papers, is likely to take place at your next meeting.

Since the foregoing was written, I have received from Professor Way another analysis of the butter sent to him; it is found to contain—

Pure fat or oil	82.70
Casein or curd	2.45
Water, with a little salt	14.85
Total	100.00

The only analyses of this material which I find in the publication in my hand are two by Professor Way, in the Journal of the Royal Society, vol. xi., part 11, "On butter by the common and by the Devonshire method"; the result in 100 parts being—

	Raw.	Scalded.
Pure butter	79.72	79.12
Casein, &c.	3.38	3.37
Water	16.90	17.51
Total	100.00	100.00

THOMAS HORSFALL.

On the motion of the Hon. A. Leslie Melville, seconded by Mr. Hoskyns, the thanks of the Council were voted to Mr. Horsfall for the favour of this communication. Mr. Woodward and Mr. Gadesden fully confirmed, by their own experience, the value of Mr. Horsfall's system of dairy management.—Prof. Way referred to the chemical principles connected with the assimilation of food of different character given to milch cows.—Mr. Scott furnished valuable evidence of the improvements effected by him in reference to dairy management in Ireland; and expressed his intention to draw up a statement of the details for the information of the Council.—The Rev. Mr. Black, of Otley, favoured the Council with his attendance, and on the part of Mr. Horsfall offered explanations on such points of the communication then read to the Council as the members required.

A WEEKLY COUNCIL was held on Wednesday, the 16th of May. Present, Mr. Raymond Barker, V.P., in the chair, Lord Berners, Hon. W. H. Yelverton, Mr. George Raymond Barker, Mr. Hodgson Barrow, M.P., Mr. Ivatt Briscoe, Mr. Caird, Dr. Calvert, Mr. Camps, Mr. Coles, Mr. Corbet, Mr. Deere, Mr. T. M. Evans, Mr. Fuller, M.P., Mr. Gadesden, Mr. Gleig, Mr. V. Hawkins, Mr. Fisher Hobbs, Mr. Jennings, Mr. Stone, Mr. Kinder, Mr. Knowles, Mr. Magendie, Mr. Matthews, jun., Mr. Moore, Mr. Orlebar, Mr. Parkins, Mr. Pickin, Mr. Pocock, Mr. Scott, Mr. Slaney, Professor Simonds, Mr. Bridgman Simpson, Mr. Spencer Stanhope, Mr. T. E. Thomas, Professor Way, Mr. Jonas Webb, and Mr. Weir.

DAIRY MANAGEMENT.—Mr. Horsfall informed the Council that the greatest amount of butter obtained in his dairy from a given quantity of milk was in December, 1854, from cows on stall food, when it reached 27¼ oz. of butter from 16 quarts of milk. He took that opportunity of correcting an error in his communication of last week, in which it was stated: "On Monday, April 30, 16 quarts of cream having yielded 26 rolls (of 25 oz. each) of butter." Instead of "26 rolls," the quantity should have been stated as "16 rolls."

LECTURE.

CHEMICAL PRINCIPLES INVOLVED IN THE PRODUCTION OF BUTTER.—Professor Way, consulting-chemist to the Society, delivered a lecture before the members, on "The Chemical Principles involved in the Production of Butter." The subject, he said, naturally divided itself under two heads—the 1st, that of so treating cows as to cause them to produce a large quantity of milk rich in butter; the 2nd, that of so treating the milk as to separate as fully as possible, and in the greatest perfection, the butter which it contains. The first is a question of physiology; the second one dependent partly upon chemical, partly upon physical principles. The one involves the phenomena of animal life, and is materially influenced by race and breed in the individual animal, and to a certain extent, therefore, is beyond our control; the other an affair of matter with which we may deal at our pleasure, and in the treatment of which we may perfectly control the results, inasmuch as we have full command of the conditions. He did not, on the present occasion, intend to enter at any length upon the former branch of the subject, which might be much more ably handled by his colleague, Professor Simonds. Mr. Way called attention to the great and fundamental doctrine from whence all our reasoning on the subject of animal nutrition now started, namely, the identity, or almost identity, between the principles of the vegetable and animal body. The conclusion founded upon this identity, and which, he said, was natural enough, was that with slight modifications the vegetable principles were assimilated by the animal frame; the albuminous matters being converted into flesh and muscle, the oily ingredients into animal fat, and the mineral salts of the food into bone and other solid parts of the animal body. Still he would wish to guard them against the conclusion, that because milk is an animal product of well-defined chemical composition, and because, again, the composition of various plants which serve as food for cows is well known, that, therefore, we might select food most rich in the vegetable principles analogous to cheese or butter, and using the body of the animals as a machine, might convert this food into so much cheese or butter at our pleasure. Such a conclusion was inconsistent with our knowledge of the laws of animal nutrition; not that it could be doubted that the nature of the food influenced materially, and under like conditions absolutely, the production of these animal products, but that we must admit a subordination of this supply to the functions of the animal—the formation of certain animal principles presupposing a supply of similar principles in the food, but a greater or less supply of these principles not being necessarily attended with a corresponding increase of their representatives in the product; indeed, the balance of evidence on the subject of the production of butter seemed to be in favour, for this purpose, of that class of substances which contained the greatest proportion of nitrogenous, or cheese forming principles. Something of the kind had certainly been found to be the case in the artificial feeding of plants, in which, greatly through Mr. Lawes' experiments, we had found that the wheat crop, by no means the most rich in nitrogen, benefited more than most others by manures containing this element, and was not sensibly affected by phosphoric manures, although eminently a phosphate-containing plant; whilst turnips, on the other hand, not containing any great quantity of phosphates, are successfully cultivated by this artificial addition. Mr. Way remarked, that if the time at his disposal, by the indulgence of the members, should allow of it, he would have a few remarks to make before he sat down on the subject of the treatment in regard to food, &c., of cows, but that it seemed more conducive to the right understanding of the subject that he should first draw their attention very shortly to the composition of milk, and the circumstances affecting the successful extraction of the butter from it. The milk of an animal was intended to form the sole food of its young for a certain period after birth. We should expect it therefore to contain all the principles necessary, not only for the support of life, but for the growth and increase of the animal frame. Milk should be, and indeed was, the type of a perfect food. We found in it, therefore, a representative of those substances fitted for the production of flesh, another of those adapted to form fat, a third suited to support respiration (which is the proximate cause of animal heat), and lastly, the various earthy and alkaline salts, which form the bones and are necessary to the constitution of the blood and animal fluids generally, these substances being all mixed up into a comparatively homogeneous liquid by the presence of a large quantity of water. Mr. Way now called attention to the different constituents of milk, namely, curd—called by the chemists casein—butter, sugar of milk, &c. Commencing with the latter, he explained how, under the influence of ferments, it was capable of conversion into an acid substance called lactic (or milk) acid. He stated that butter contained two or three fatty substances, having different melting points, and consequently more or less fluid at given temperatures; hence the different solidity of butter, according to food and other conditions of its production. One or more of these fatty matters were liable, under the influence of ferments, or by the action of the air, to pass into other compounds of a rank, disagreeable smell and flavour. The curd of milk was a substance unlike the others, containing nitrogen, and was liable, by exposure to the air, to the putrefactive changes to which all other similar animal matters were subject. In the commencement of these changes the casein became a ferment, having the power rapidly to convert milk-sugar into lactic acid. Hence the spontaneous coagulation of milk. The altered casein had also the property of converting the fatty matter of butter into the varied products to which he had alluded, and which were so objectionable in bad butter. In the changes to which these three substances were subject would be found the key to all the phenomena observable in a dairy, and to every precaution which experience had dictated. Mr. Wsy shortly adverted to the processes for the preparation and preservation of butter. The first of these was the creaming of the milk—a mechanical process chiefly, but possibly involving some slight chemical change of the casein. The milk, being an emulsion as it were of oil and water, would of course, after a time, tend to separate, upon standing, into two portions, the lighter rising to the surface. The butter did not, however, as they well knew, separate altogether in this way; but the cream was a kind of concentrated milk, in which the proportion of butter was largely increased. Although it was an axiom in the dairy that perfect stillness of the milk was essential to successful creaming, he was not quite sure whether the communication of a very gentle combined centrifugal and ascending motion of the fluid might not conduce to much greater rapidity in the rising of the cream. Such a motion might readily (by means of weights or springs) be given to the milk-pans themselves by placing them on slowly-rotating tables; the sides of the pans having flanges on the inside sloping from the top to the bottom, which would communicate an ascensional motion to the liquid. Mr. Way thought that this movement would be likely to be beneficial. The oily particles would more readily receive the upward impetus which was favoured by their own buoyancy, whilst in the descending current the reverse would be the case. Of course he meant that the movement of the pans should be of the very gentlest nature. The second operation—namely, churning the cream—was also a mechanical one, but it was attended with chemical changes. In the process of churning heat was produced, partly no doubt from friction, but also from other and not mechanical causes. The cream, too, if sweet when put into the churn, became sour during the agitation; and this was evidently due to an absorption of oxygen by the casein, and the conversion, under its influence, of the milk sugar into lactic acid. Indeed, the souring of the cream seemed an essential part of the process. He could not help believing, however, that all or nearly all the mischief that happened to butter on keeping was due to the alteration of casein then taking place during the churning. Butter always contained a portion of casein, in some cases not exceeding a half per cent., in others as much as three per cent. of its weight. It was to the presence of this substance in butter that the difficulty of keeping it was to be attributed. He had before explained what changes might be expected under the circumstances. If the casein, however, were as yet unaltered when it was included in the butter, it would require the presence of air to enable it to make the butter rancid. Now, supposing the souring of cream to be important in churning, why not obtain it artificially by the addition of lactic or acetic acid; at the same time, as far as possible, excluding air from the churning? There could be no reasonable doubt that this small quantity of altered casein was the insidious enemy which, for butter that was to be kept any length of time, it was so important to guard against. Butter, after being melted in water and strained whilst hot through cloths to separate the curd, might be kept any length of time without change, but of course it had lost all the agreeable flavour of ordinary fresh butter. With regard to the preservation of butter by salting, Mr. Way wished to show the great difficulty which must exist of mixing three or four per cent. of salt intimately with butter, by the ordinary methods of hand treatment. The salt was intended to render the cheesy matter inactive, but it could only do this by absolute contact with every particle; and such contact, he was convinced, could not be attained manually. A machine had been invented in America for butter-curing, the butter, enclosed in an endless bag, being drawn between grooved rollers immersed in a vessel of water, the salt being at the same time added by a hopper. This machine, however, did not seem to him fitted to ensure a perfect mixture of the butter and salt; and the water was objectionable, because it destroyed the flavour of the butter. He had several years ago thought that a machine somewhat like Clayton's clay-screening cylinder would be admirably adapted to mix the salt with butter; a cylinder, with a disc perforated with small holes placed at equal distances from its end, through which the butter might be forced, like vermicelli, backwards and forwards by pistons at either end, acting alternately, would readily be arranged. At the same time, by connecting this cylinder with an exhausting pump, the air might very effectually be removed; so that finally, when the process was complete, the butter might before removal be pressed into a solid mass, and immediately received in a proper tube for preservation. Mr. Way believed that butter so preserved, with an intimate admixture of salt and free from air, would keep good and sweet for any length of time. He hoped that the principles he had endeavoured to put before them would bear out the practical experience of those present. The management of a dairy might be summed up in three words—temperature, cleanliness, ventilation. Temperature, because all the changes to which he had referred were very much enhanced in activity by every degree of temperature above a certain point. Cleanliness, because everything that assisted the decomposition of casein, which all animal matters did, would promote decay in the milk and its contents. Ventilation as a part of cleanliness—cleansing, in fact, the atmosphere; and in respect to this latter point, he would suggest the use of freshly burnt charcoal, as likely to be of the greatest service in the dairy. It had lately been shown by Dr. Stenhouse that charcoal absorbed from the air decaying matters with great rapidity. The removal of such matters from the air was one of the great objects of ventilation in a milk-house, and he would strongly recommend a trial of it spread in baskets or thin layers in different parts of the dairy.

On the motion of Lord Berners, seconded by Mr. Slaney, the best thanks of the Council were voted to Professor Way for the interesting and scientific lecture he had then delivered; Lord Berners taking that opportunity of dwelling upon the importance of ventilation in dairies and stables, and the appropriate feeding of dairy cattle, as derived from his own experience; and Mr. Slaney of suggesting that a little work for cheap distribution might be drawn up easily and with much advantage, stating plainly and concisely the points of knowledge on essential conditions connected with dairy subjects.—Mr. Caird bore testimony to the practical value of Mr. Horsfall's dairy arrangements, he having visited his establishment in Yorkshire four years ago.—On the motion of Mr. Jonas Webb, the best thanks of the Council were voted to the Chairman for the kind and efficient manner in which he had presided over the meeting on that occasion.

PARIS AGRICULTURAL SHOW.—All members of the Society who intended to make entries for the approaching Agricultural Show to be held in Paris at the beginning of June, were requested to lose no time in sending their certificates of entry to the French Consul-General, 36, King William-street, City, London, by the 24th inst., when the entries would close.

The Council adjourned over Wednesday the 23rd (being the Derby-day), to Wednesday the 30th of May, when the discussion would be resumed.

AUDIT OF ACCOUNTS, May 18.—Mr. Raymond Barker, Chairman of the Finance Committee, and Mr. Knight, Mr. George Raymond Barker, and Mr. Dyer, Auditors on the part of the Society, examined, audited, and certified as correct the accounts for the half-year ending December 30, 1854.

SPECIAL COUNCIL, May 18.—Mr. Raymond Barker, V.P., in the chair. On the motion of Mr. Milward, seconded by Mr. Fisher Hobbs, the report to be made by the Council to the ensuing General Meeting of the Society was taken into consideration and agreed to.

The Annual Meeting of the Royal Agricultural Society took place on Tuesday last, in Hanover Square. The chair was taken at 12 o'clock by Mr. MILES, M.P., the President for the year. Among those present were Lords Feversham and Berners, Sir J. Johnstone, Col. Challoner, Mr. R. Barker, Mr. W. F. Hobbs, Mr. Jonas Webb, &c.

The bye-laws relating to the anniversary elections having been read,

Col. CHALLONER rose to move the election of a President for the ensuing year. He felt great pleasure in announcing that he had the permission of Lord Portman to say, that if it were thought that the Society would be benefited by his accepting the presidency for the ensuing year, he would waive all difficulties, and consent to fill the office. Under these circumstances, and knowing how glad the members generally would be to find Lord Portman once more acting as their president, he felt great satisfaction in proposing his Lordship, and had no doubt that the proposal would be passed unanimously (cheers).

Mr. R. BARKER said it was with very sincere pleasure that he seconded the motion. When his Lordship was first invited again to fill the situation of President, he gave one or two reasons why it was, in his opinion, undesirable that he should be elected. One reason was that his long abstinence from any active participation in the management of the Society's affairs prevented him from being acquainted with the actual state of the Society, or at least with the working of the Council; and at the same time he urged that the state of his health was such as almost to preclude his discharge of the duties of the office. He (Mr. R. Barker) had, however, learnt with peculiar gratification what the meeting had heard from his friend Colonel Challoner, namely, that his Lordship had now consented to waive all personal difficulties, and every consideration which stood in the way of his compliance with the wish of a very numerous body of members, that he would consent to preside over the Society during the ensuing year.

The CHAIRMAN then put the motion, which was carried unanimously.

On the motion of Mr. KNIGHT, the trustees were re-elected.

Mr. R. W. BAKER proposed the re-election of the vice-presidents, expressing his conviction that it was impossible for the society to have a more satisfactory list.

The motion after being seconded by Mr. Jonas Webb, was put, and carried.

The meeting then proceeded to the election of the

Council for the ensuing year; and after the lapse of a few minutes, the scrutineers announced that the house list had been unanimously re-elected.

The secretary, Mr. HUDSON, then read the Report of the Council, which was as follows:—

REPORT.

Since the last half-yearly meeting in December, the Society has lost, by death and otherwise, 227 of its Members, and has gained by election 132 new Members. The Council, on the recommendation of the Finance Committee, have also removed from the list of the Society the names of 285 Members who have made no payment during the last seven years. They have unanimously elected Dr. Edward Hartstein, Professor of Agriculture in the Royal Academy of Poppelsdorf, an Honorary Member of the Society. The Society accordingly now consists of

89 Life-Governors,
141 Annual Governors,
795 Life-Members,
3,838 Annual Members, and
19 Honorary Members,

making a total of 4,882 names on its list at the present date.

The funded property of the Society stands at £9,264 8s. 11d. in the Stock which has now become the New Three per Cents.; the current cash-balance in the hands of the Bankers being £3,225, which includes £1,400 as a contribution from the authorities of Carlisle towards the expenses of the country meeting of this year. Since the date, in November last, when the Council ordered the sale of £1,500 from the invested capital, the following payments have been received—

	£
Arrears of subscription......	1,677
Current subscriptions	1,847
Life-compositions..........	389
	£3,913

while every claim against the Society has been duly discharged.

The continued indisposition of Mr. Pusey, and the consequent suspension of his long and invaluable labours to the Society as the Chairman of the Journal Committee, have rendered some temporary arrangements in that department necessary. The Council have accordingly requested Mr. Thompson to act as the Chairman, and Mr. Wren Hoskyns and Mr. Dyke Acland as Vice-Chairmen, of the Journal Committee. The new number is now in progress, and will be published on the 1st of July. Prizes have been awarded to reports on the Farming of Buckinghamshire and Warwickshire, and also to essays on the causes of Fertility and Barrenness in Soils, and Lameness in Sheep and Lambs: a paper in the latter class has been disqualified, on account of its delivery not having been made by the 1st of March; and the prize in the class of Mildew in Wheat withheld, in consequence of the want of sufficient merit in the competing essays; while adjudications have still to be reported in the five remaining classes. The following subjects for the Essays of next year have already been adopted:—

1. Farming of Bedfordshire.
2. On the Production of Turnips possessing good keeping qualities.
3. Spring-feed Crops: with special reference to early growth.
4. The different mechanical modes of deepening the Staple Soil, in order to give it the full benefit of atmospheric influence.
5. The Chemical results superinduced in newly-deepened soil by atmospheric action.
6. The construction and maintenance of Farm Roads: with special reference to clay lands.
7. The Roots of the Wheat Plant: the history of their growth and development.
8. Essay and Plans for the construction of Labourers' Cottages: with special reference to domestic convenience.
9. Account of the different modes of bringing Moorland into cultivation, based on practical experience; and specifying the methods pursued, the expense incurred, and the results as far as ascertained, regard being had to the subsoil, locality, and elevation.

Two distinct and important investigations are in progress by the Consulting-Chemist of the Society, namely —1. On the chemical effects of the atmosphere on the soil and vegetation; 2. On the value to the farmer of different substances sold to him for manuring purposes. Prof. Way has already, in the course of this session, delivered before the Members two Lectures: the first, On the relation between the atmosphere and agriculture; and the second, On the chemical principles involved in the production of butter: for which he has received the cordial thanks of the Council. He has also consented to deliver a lecture on the 13th of June, On the use of fish as manure; and Prof. Simonds, as the Veterinary Inspector of the Society, has expressed his willingness to elucidate before the Members, at a Weekly Council in the course of next month, the Physiological Conditions affecting the quantity and quality of Milk secreted by the Cow under different circumstances of feeding and management.

The Governors of the Royal Veterinary College have made a most satisfactory report to the Council of the successful manner in which the special objects of the Society in reference to domesticated animals have been carried out in that establishment under the inspection of Prof. Simonds.

The programme of the Country Meeting, to be held in the city of Carlisle, in the week commencing Monday, the 23rd of July next, has just been issued, and the arrangements are nearly completed. At this meeting, so favourably situated in reference to the south of Scotland and the north of Ireland, additional prizes are offered for Reaping Machines and Steam-Cultivators, as well as for Scotch and Galloway Cattle, Cheviot and Herdwick Sheep, and for Clydesdale and other horses.

The entries for implements closed on the 1st instant; and though the number is not equal to that of either of the last two years, it has been ascertained that the covered shedding, twenty feet wide, engaged by exhibitors in that department, will extend to very nearly three-quarters of a mile in length. The entries for live stock, which will not close till the 1st of June, are already numerous.

The Council have again to acknowledge the liberality and ready co-operation of the Railway Companies, in promoting the objects of the Society in the transit of

Live Stock and Implements to the Country Meeting. The principal companies have already signified their consent to a renewal of their concessions of last year, in favour of the exhibitors at the Carlisle Meeting.

The Council have decided to hold the Country Meeting of 1856 in the district comprising the counties of Bedford, Buckingham, Cambridge, Essex, Hertford, and Huntingdon, at Chelmsford, the county town of Essex.

They have also determined that the Country Meeting shall be held, four years hence, in the Central District, which will comprise the counties of Oxford, Warwick, Northampton, and Berks: and thus, after a circuit of twenty years, the Society will return to that part of the kingdom in which, at the city of Oxford, under the most favourable circumstances, it held its first meeting.

The Council have viewed with much interest the progress of measures adopted by the Government of France to stimulate and improve its agriculture. At the request of the French and English Foreign Departments, the Council have taken every means to make known in this country the inducements held out and the facilities afforded to the exhibitors of the United Kingdom, at the Agricultural Meeting to be held next month in Paris; and they have decided that six of their members shall form a deputation, to be present on that occasion. The Council trust that this inter-national gathering will be attended with the most favourable results to the agriculture as well as to the cordial understanding now so happily subsisting between the two nations.

The Council have continued to be favoured by the Earl of Clarendon with copies of successive despatches received at the Foreign Office from her Majesty's Ministers and Consuls abroad, reporting the result of their inquiries and researches connected with the occurrence of Guano or the Nitrates in tropical districts. Some of these communications have been of an important character, and have referred to discoveries of extensive deposits of those valuable manures, as well as to the occurrence of an unlimited supply of native Carbonate of Soda in South America. His Lordship has conveyed to the Council an assurance that whatever facilities or privileges are granted to other countries by the Governments within whose territories these newly-discovered deposits occur, will be claimed by her Majesty's Government on behalf of the agricultural and commercial communities of the United Kingdom.

By order of the Council,
James Hudson, Secretary.

Mr. R. Barker, as chairman of the Finance Committee, read a statement of the accounts, corresponding with that contained in the Report.

The report and statement were both adopted.

Mr. Eyston, of Berks, moved a vote of thanks to the auditors, observing that he thought the Society was much indebted to those gentlemen, and all the officials of the establishment, for the manner in which they performed their respective duties.

Mr. Bradshaw seconded the motion, which was then agreed to.

Mr. Knight, one of the auditors, returned thanks. He remarked that the accounts were so admirably kept, that it was really a pleasure to audit them, and he was sure that if his colleagues were there, they would concur in that acknowledgment.

The Council business having been disposed of, the Chairman said he had now to inquire whether any member had any remark to make, or any suggestion to offer, which might be reported to the Council.

The Secretary said he had received a letter from Mr. Eddison, of Leeds, suggesting various things with regard to the Journal of the Society.

The Chairman observed that it must of course be referred to the Council. If any member present wished to make any remark or communication, he should be happy to hear him.

No one having responded to this appeal,

Lord Feversham said he had a resolution to propose which he was sure would be received with great pleasure by the meeting: it was, that the thanks of the meeting be presented to their worthy and respected Chairman (cheers). This was a motion in which he was convinced every gentleman present would most cordially and sincerely concur. The Society was greatly indebted to the hon. gentleman for his kind and efficient services on all occasions; and he for one felt confident that during the year of his presidency the Society would continue in a state of progressive prosperity.

The motion having been seconded by Mr. Druce, was put by Mr. R. Barker, and carried by acclamation.

The Chairman in reply said he felt exceedingly obliged to the meeting for the honour which they had done him in voting him their thanks as the President of that Society. His attendance there had not been so good as he could have wished in consequence of the interposition of other duties which devolved upon him in another capacity. It happened, unfortunately, that Wednesday—the day on which the meetings of the Council were held—was a day on which country members were often obliged to give their attendance in the House of Commons (Hear, hear). To this he might add that he often had to serve on a committee on the same day, and that his duties as a committee-man still further interfered with his attendance at the meetings of the Council. At the same time, when he recollected the kindness with which he had been honoured thus far during his presidency—when he recollected the cordial co-operation which there had been between all the members of the Council in everything which tended to promote the welfare of the Society — he felt bound to express his hearty thanks to the Council for the assistance which he had received from them, as well as for the efforts which they had constantly made to promote the interest and welfare of the institution. He had great satisfaction in stating that the Council had been met in the kindest possible manner by the Foreign Secretary, and that by means of communications from the Vice-consuls in South America and elsewhere, everything had been done that could be done to assist them in their efforts to obtain an adequate supply of guano and nitrates. Communications had been received from the Foreign Office almost every week, and he was glad to be able to state that, through the exertions of the Vice-consuls in different parts, not only had the supply of guano been increased, but, further, a certain soda had been discovered in large quantities, which, if it were not very beneficial to agriculturists, would be of the greatest advantage to manufacturers. While, therefore, their efforts were especially applied to whatever tended to promote the interest of the farming community, they were, it appeared, useful also in the development of commercial prosperity (Hear, hear). In conclusion, he begged to say that he hoped to have the pleasure of seeing those whom he saw at the approaching meeting at Carlisle. He hoped to see a large gathering in that city, and to conclude his year of office as he began it, with the cordial support of those who did him the honour of electing him. (Cheers.)

The meeting then separated.

OFFICIAL REPORT ON THE COLLECTION OF AGRICULTURAL STATISTICS.

It would be difficult to conceive anything more unsatisfactory than the result of the last extended experiment at the collection of agricultural statistics. The thin Blue-book just published embodies of course the several reports from the counties and districts in which the attempt has been made. These reports are little more than one continual echo of disappointment and complaint. If we sum up the general experience of the inspectors, we shall scarcely find one feature in the system that can be said to have answered. If it succeeds in one union, it fails in the next. To be of any value at all, statistics must necessarily be perfect. The only useful deduction to be gathered from this trial is its utter impracticability. If the Government or the people really want information of this kind, they must devise some better means to obtain it.

This failure is attributable to a combination of two causes. The principle is as wrong as the plan for carrying it out is weak. As to the inquisitorial character of the inquiry, we are inclined to think that under any better arrangement this would be, after all, no very serious difficulty. Many people, perhaps, would refuse to make returns of their incomes, had they the option of doing so. With the election in their own hands, some of the farmers of this country have acted in such a spirit, and declined to furnish what was sought from them. It will be found, however, that one of the chief reasons for this was, an objection to deliver it into the hands they were expected to. With a stronger authority and a more direct warrant for what they asked, the official agents of this movement would have been enabled to report with proportionately greater success.

The plain question is simply this: Are such returns necessary? Does the Government feel that it should be supplied with the information it asks? If so—if the inquiry is an important one, surely it should have been entered on with more determination to have it carried through. As it is, everything is at the mercy of everybody else. The Boards of Guardians take up the matter, or not, as they like; the Poor-law officers act, or not, as they, too, please; and the farmers, again, answer or not, as they choose. By such a means as this, grounded on the most pitiful economy, and depending on the most indefinite of agency, is it proposed to establish a complete collection of agricultural statistics.

The great mistake from the very first has been here. Those who had to give the initiative treated the matter as a trifle that might or might not be persevered with. If they had wished it to break down, they could scarcely have hit upon a better plan to achieve their object. Like the gentleman who was continually asking what time it was, for want of something to say, have the Government been asking this of us, with something the same air of listless unconcern as to whether we answer or not. "You can if you please, you know; we shall go to little trouble or expense in pressing you to do so, only do it if you like." We really do not know whether the most practical man of the lot was not the official gentleman at the Society of Arts, who proposed that each county should duly supply the returns, and then levy a county-rate to pay the expenses of being allowed to do so.

Let us, however, turn to the Blue Book for evidence in support of what we have advanced. Mr. Hawley, then, who must be regarded as the most experienced authority in this business, reports thus—

> "In the opinion expressed by some of the Guardians of the impracticability of collecting Agricultural Statistics by means of voluntary compliance I fully agree; for even were the *general* assent of the agriculturists given to the measure, there would always be found a few who, from obstinacy or neglect, or some other cause, would fail to make their returns, and their default would not only entail a considerable amount of additional labour on the enumerators, and retard the classifier in the performance of *his* duties, but would vitiate the correctness of the general return for the Unions, inasmuch as the hiatus caused by their neglect, if filled up at all, must be supplied by approximation. If then the voluntary system

shall be found inadequate to the purpose, its defects can only be supplied by statutory enactment, rendering the making the returns compulsory."

Sir John Walsham, in his report from Norfolk and Suffolk, is

> " Constrained to state that, in my now more matured judgment, Agricultural Statistics cannot be *generally* collected in England, unless the completion and due return of the schedules be made compulsory on owners and occupiers by Act of Parliament. I do not, however, apprehend that such a legislative enactment would excite much, if any, ill feeling. The very persons whose opposition it has been found impracticable to overcome, usually coupled their refusals to furnish information with expressions significant of their readiness to give such information if asked for (as they termed it) 'constitutionally.'"

Mr. Groves, writing from Worcestershire, says:

> " I am convinced from the experience I have gained that a complete, uniform, and speedy collection of Agricultural Statistics in England cannot be looked for from the employment of the executive machinery of the Poor Law without compulsory powers."

Mr. Doyle, the Inspector for Salop and Denbigh, declares:

> " If there be one point connected with this subject upon which I have found opinion to be uniform, it is that it should be rendered compulsory upon occupiers to furnish the information that may be necessary for obtaining full and correct Agricultural Statistics. I might fill many pages of a report with illustrations of the difficulties to be encountered in the collection of Agricultural Statistics, unless by agents who are armed with authority to call for them."

And so on, might we multiply this same conclusion from chairmen of boards, clergymen, and others, almost ad infinitum. Beyond this, there is a very common impression that under any circumstances Boards of Guardians will never furnish efficient machinery for carrying out the collection; while, as to the rate of remuneration at present offered, it will be enough to say that many of the relieving officers who have once undertaken the duties of enumerators decline again to do so, being positively money out of pocket by their first essay.

We have not space here, and, indeed, it would hardly be necessary to follow this evidence much further. Nothing, we repeat, could show less encouragement for the future from what has already been achieved. It is a failure, too, almost altogether attributable to the want of spirit and energy with which the experiment was started from head-quarters. Put before them in a more business-like way, we believe well enough of the farmers to think that they would have been far better inclined to entertain what was asked of them. As it is, we agree with Mr. Taylor, of Alresford, " That the failure of the measure is rather to be attributed to the manner in which the subject is proposed to them, and the system by which it is attempted to be carried out, than to any preconceived opinions as to its necessity or utility in a national point of view."

REVIEW.

GLAISHER'S METEOROLOGIST.

Published by Chapman and Hall, 193, Piccadilly, London.

This is an illustrated weather-table for the British capital and metropolitan provinces, arranged by Bennet Woodcroft, Esq., exhibiting at one view the mean monthly time of sunrise, state of the rain gauge, thermometer, barometer, dew point, and humidity of the atmosphere at London, from data kept and tables formed by James Glaisher, Esq., F.R.S, extending over many years. It also shows the direction of the wind at Chiswick for the last year, and the mean monthly temperature of the Crimea. These are all seen at first sight without any trouble, loss of time, or liability to error as involved where tables consist of monotonous columns of figures, the one almost imperceptible from the other without a closer scrutiny than the business habits of the capital will allow.

The table is coloured, and tastefully ornamented, being surmounted with four female figures indicative of the seasons: Spring, Summer, Autumn, and Winter. Underneath these, the body of the table is subdivided into sixteen columns, twelve monthly, and the remaining four—two on the left side for a graduated thermometer and rain gauge, and two on the right for a graduated barometer and the twenty-four hours of the day. At the bottom of each monthly column, again, there are miniature drawings of a similar character to those at the top, indicative of rural life and the monthly operations of the field; immediately above these in each column a circle or dial, with arrows pointing to the prevailing direction of the wind, there being figures on the arrows to denote the number of days the wind remained in that course: and in the remaining space of each column there are, first, at the top, the name of each month; next, the time of sunrise; and then four coloured lines—red, black, blue, and gold—showing the state of the thermometer and dew point, hydrometer, rain gauge, and barometer, respectively; while a dotted line from the thermometer on the one side, to the barometer on the other, intersects the whole, showing the annual mean height of the thermometer (48.35 deg. Fahr.), quantity of rain (2.175 in.), height of the barometer (29.918 in.), dew point (43.66 Fahr.), and amount of humidity in the atmosphere (.832). As an example, the following are the indices for the current month, May:—

A group of females inaugurating the month.

Sunrise, 4 h. 11 m.

Thermometer, London......	52.5	Fahr.
Ditto, Crimea	61.41	„
Dew point, London........	46.1	„
Humidity, London	0.780	
Rain gauge „	2.1	*inches.*
Barometer, „	29.941	„

Prevailing course of the wind last year, 12 days east.

Apart from the philanthropic object in view—the profit derived from the sale of the print being appropriated to the Patriotic Fund—we recommend " Glaisher's Meteorologist" to our readers. Its artistic merits are of the highest order, recommending it to a place beside every barometer. To the market-gardeners of this great metropolis it is invaluable, and, *indeed,* to every one who has a garden or is interested in the weather

SPECIFICATIONS OF AGRICULTURAL PATENTS

PUBLISHED DURING THE PAST MONTH.

[Can be had of Bennet Woodcroft, Esq., Great Seal Patent Office, 25, Southampton Buildings, Chancery Lane, London, by remitting postage stamps to cover value and postage for sums under 1s., and Post-Office Orders above it. Single copies will generally require six stamps, but one pound weight can be had for them.]

CHARLES FREDERICK STANSBURY, 17, Corn-hill, London—"Machinery for the Manufacture of Screws," No. 1,996—date, 1854—price 7d.

MR. HENRY DAWES, Ironmaster, Handsworth, Staffordshire—"Manufacture of Iron," No. 2,019—date, 1854—price 3d.

JOSEPH PORTER, Salford Screw-bolt Works, Manchester—"Machinery for the production of Nuts, Bolts, Screws, &c.," No. 2,022—date, 1854—price 1s. 5d.

JAMES ROBINSON, Manufacturing Chemist, Huddersfield, Yorkshire—"Furnaces, Fire-boxes, &c.," No. 2,027—date. 1854—price 1s. 3d.

AUGUSTE EDOUARD LORODOUX BELLFORD, 16, Castle-street, Holborn, London—"Machinery for Drilling Stone," No. 2,032—date, 1854—price 7d.

WILLIAM HODSON, Tile-maker, Kingston Square, Hull—"Apparatus for the Manufacture of Bricks, Tiles, &c.," No. 2,041—date, 1854—price 1s. 2d.

PETER SPENCE, Manufacturing Chemist, Pendleton, county of Lancaster—"Obtaining Sulphur from Iron Pyrites, &c.," No. 2,047—date, 1854—price 3d.

THOMAS GARNETT, Engineer, Liverpool—"Steam-engine and other Governors," No. 2,050—date, 1854—price 7d.

GEORGE McNAUGHT, Saddletree Maker, Glasgow—"Saddletrees," No. 2,056—date, 1854—price 5d.

JOHN ROGERSON and JAMES BRIMELOW, Engineers, Bolton, county of Lancaster—"Steam-Engines," No, 2,082—date, 1854—price 11d.

JAMES GLESON ANDERSON GWYNNE, Engineer, Essex-street, Strand—"Machinery for Lifting, Forcing, and Exhausting," No. 2,048; date 1854—price 9d.

HENRY ALEXANDRE GENETREAU, 16, Castle-street, Holborn, London—"Carriage-shafts, Poles, and Beams," No. 2,058; date 1854—price 3d.

PHILIP JAMES CHABOT, Middlesex — "Improvements in supplying Air to Furnaces," No. 2,061; date 1854—price 3d.

GEORGE SPENCER, 3, Alpha-road, New-cross, Deptford—"Improvements in the External Coverings of Roofs, and Walls of Buildings and Sheds, and in the Windows of such Buildings and Sheds," No. 2,068; date 1854—price 6d.

THOMAS GRIFFITHS, Madeley, Shropshire — "An Improved Pump for Raising Water," No. 2,072; date 1854—price 1s. 4d.

JONATHAN EDGE, Engineer, Bolton-le-Moors, County of Lancaster—"Pistons," No. 2,076; date 1854—price 6d.

THOMAS MOHAN, Farmer, Aclint, County of Louth—"Churns," No. 2,093; date 1854—price 8d.

THOMAS COLLINS, Brickmaker, Gayton, Northamptonshire—"Manufacture of Bricks and Tiles," No. 2,101; date 1854—price 10d.

THOMAS SHERRIFF, Engineer, Glasgow — "Formation of Moulds for Metallic Castings," No. 2,109; date 1854—price 7d.

WILLIAM M'NAUGHT, Engineer, Rochdale, County of Lancaster—"Slide-valves of Steam-engines," No. 2,123; date 1854—price 6d.

AIME ANTOINE JOSEPH LEGENTIL, Arras, France—"Pumps," &c., No. 2,133; date 1854—price 10d.

THOMAS EDWIN MOORE, Engineer, 3, Great Titchfield-street, Marylebone—"Machinery for Producing Curvilinear and Annular Cuttings in Metal," &c., No. 2,139; date 1854—price 1s. 1d.

GEORGE TAYLOR, 22, Water-street, Liverpool — "Governors of Steam and other Engines," No. 2,596; date 1854—price 5d.

THOMAS PROSSER, Merchant and Civil Engineer, Birkenhead, Cheshire—"Welding and Drilling Metallic Plates, &c.," No. 2,135; date, 1854—price 1s. 6d.

ENOCH OLDFIELD TINDAL, Ironfounder, Scarborough, Yorkshire—"Mangles and Wringing Machines," No. 2,141; date, 1854—price 6d.

WILLIAM FROST, Engineer, Wine-office-court, Fleet-street, London—"Improvements in Steam Engines," No. 2,144; date, 1854—price 7d.

ROBERT WAY WREN, Engineer, Fogginton, Devonshire—"Machine for the Manufacture of Bricks and Tiles," No. 2,154; date 1854—price 1s. 4d.

GEORGE THOMAS SELBY, Manufacturer, Smethwick, Staffordshire — "Furnaces," No. 2,155; date, 1854—price 6d.

WILLIAM CROSSKILL, Beverley, Yorkshire—"Portable Railways," No. 2,162; date, 1854—price 1s.

GEORGE WYZELL KNOCKER, Esq., Busby Ruff, Dover, Kent—"Improvements in obtaining Motive Power by Means of Water," No. 2,168; date, 1854—price 6d.

PIERRE ETIENNE PROUST, 16, Castle-street, Holborn, London, "Lubricating Apparatus for Axles, &c.," No. 2,173; date, 1854—price 1s.

WILLIAM WHITE, Chemist, York Villa, Kensington Park, Bayswater—"Manufacture of Manures," No. 2,181; date, 1854—price 4d.

JAMES TIMMINS CHANCE, Birmingham—"Machinery for Moulding and Shaping Fused Basalt or Trap Rock," No. 2,182; date, 1854—price 3d.

SIR JAMES CALEB ANDERSON, Bart., Fermoy, county of Cork—"Locomotive Engines," No. 2,189; date, 1854—price 1s. 9d.

CHARLES FREDERICK STANSBURY, 17, Cornhill, London—"Apparatus for Heating Buildings," No. 219; date, 1854—price 7d.

WILLIAM JAMES BARSHAM, Stratford, Essex—"Machinery for crushing Mineral Substances, &c.," No. 2,193; date, 1854—price 10d.

JOHN BONNALL, Engineer, Grantham, Lincolnshire—"Lubricating Apparatus," No. 2,208; date, 1854—price 5d.

LIONEL JOHN WETHERELL & AUGUSTUS JOHAN HOFFSTAEDT, Compter-street, Clerkenwell, Middlesex, and Albion-place, Surrey—"Pumps," No. 2,214; date, 1854—price 8d.

CLAUDE FRANCOIS VANTHIER, Engineer, Dijon, France—"Blowing Machines," No. 2,300; date, 1854—price 6d.

JOHN PLATT, Mechanical Engineer, Oldham, county of Lancaster—"Machinery for the Manufacture of Bricks," No. 2,238; date 1854—price 10d.

JOHN JAMIESON, Engineer and Millwright, Oldham, county of Lancaster—"Steam Engines," No. 2,248; date 1854—price 11d.

GEORGE SAVAGE, Horsebreaker and Clipper, Adderbury, Oxfordshire—"Singeing Lamp," No. 2254; date 1854—price 5d.

FRANCOIS JEAN BOUWENS, Mechlin, Belgium, "Rotatory Engine," No. 2,262; date 1854—price 1s. 4d.

FERDINAND CHARLES WARLICH, Suffolk-street, Middlesex — "Improvement in Generating Steam, No. 2,265; date 1854—price 3d.

JOSEPH HOPKINSON ("The Younger"), Engineer, Huddersfield, Yorkshire—"Steam Engines and Boilers," No. 2,266; date 1854—price 1s. 4d.

WILLIAM THOMAS SMITH and **GEORGE HILL**, New Hampstead-road, Kentish-town, Middlesex — "Improvements in Machinery or Apparatus for Winnowing, Washing, Sifting, or Separating Corn, Gravel, Minerals, and other Materials, No. 2,273; date 1854—price 7d.

RICHARD HUGH HUGHES, 95, Hatton-garden, London —"Machinery for the Transmission of Motive Power," No. 2,274; date 1854—price 9d.

COLIN MATHER, Salford Iron Works, Manchester—"Machinery for Boring, Driving Tubes into the Earth, &c., No. 2,275; date 1854—price 1s. 5d.

JOSEPH ECCLES, Cotton Spinner, Blackburn, county of Lancaster — "Manufacture of Bricks," No. 2,283; date 1854—price 8d.

CHARLES HARGRAVE, Manufacturer, Birmingham—"Improvements in Annealing Cast-iron, or in rendering Cast-iron malleable," No. 2,327; date 1854—price 6d.

THOMAS HARRIS, Engineer, Nantyglo, Aberystwith, county of Monmouth—"Steam Boilers," No. 2,142; date 1854—price 8d.

AGRICULTURAL PATENTS.

TABLE OF AGRICULTURAL PATENTS GRANTED BETWEEN THE YEAR 1618 AND THE PASSING OF THE AMENDMENT ACT OF 1852 (FROM WOODCROFT'S SUBJECT MATTER INDEXES):—

	A.D.		Number of Patents.
For tilling and preparing land	1630 to	1852	50
Ploughs and ploughing	1618	1852	81
Harrowing, hoeing, and raking	1623	1852	36
Manuring	1636	1852	18
Sowing, drilling, and planting	1623	1852	70
Watering and flooding	1627	1850	14
Reaping, mowing, gathering, and and storing	1791	1852	39
Building for agricultural purposes	1810	1847	5
Total number of patents			313

—*Darlington and Stockton Times*, May 19.

STEAM POWER.—A most important step has just been made towards steam locomotion on common roads, and the traction of ploughs, waggons, &c., in the field. During the past week and this day, the Messrs. Boydell and Glazier, of Camden Works, Camden-town, of this place (London), have been exhibiting their "Steam Horse," performing various feats of strength. On Saturday we saw it draw, on a very rough and uneven road, first eight tons of fire-bricks with ease. To this load a rope was next attached, to a ton weight of iron over a pulley, when it started off with all the characteristic dignity of a steam-engine master of its work, dragging the bricks and rope after it, drawing the iron close up to the pulley, when, on the order being given, "Stop her!" it stood firm; and "Back her!" slowly allowed the huge block of iron to fall to the ground. The engine is a seven-horse common portable one reversed, the wheels being furnished with Boydell's "endless railway," an illustration of which we gave in No. 1199 (Dec. 18th, 1854), to which we refer. On one of the last wheels, 6 feet high, a driving wheel 5 feet in diameter is fixed, into which a small pinion on the end of the fly-wheel crank shaft works, while the "endless railway" prevents the wheels either from slipping or sinking in soft ground. The fore-wheels are steered by means of a pole with wheel, chain, and pulleys, the same as a steamboat; and a man at this wheel has entire control over the engine, turning without the tender in the narrow circle of 40 feet in diameter. The engine, we are glad to hear, is entered for exhibition at Carlisle, where Mr. Boydell, the patentee, proposes showing its capability of drawing or working ploughs, diggers, grubbers, waggons, thrashing machines, &c., &c. Ought not our implement makers interested in this "steam horse" to have seen it, if possible, in operation before the first of June, so as to be able to remove all obstacles out of the way of combination; thus procuring for it a fair trial at all sorts of work, and no disappointment?—A CORRESPONDENT.

THE COMING AGRICULTURAL EXHIBITION AT PARIS.

Within the last few years we have had some very notable examples of what the foreign market may do for English-bred stock. A taste that might be said to have commenced with, and long confined itself to our best sorts of horses, has at length gradually extended to a similar craving for cattle, sheep, and pigs. The thousands which America once gave for Priam, the race-horse, have come to be rivalled by the hundreds the same country now continually offers for bulls and cows. Southdown sheep are let at biddings never before equalled, and the hirer is announced as an agent from some other country. Small pigs make great prices, and still the breeder looks to the stranger as his best customer. He comes again, and again, too; the almost certain result being "a good connection" and "an extended trade."

It must surely be to our interest to extend this as far as possible. Curiously enough our best buyers at present are those living the most distant from us. Would it not be feasible to establish another good market nearer home? It is true, the continent already has some appreciation of our different breeds of animals, but nothing that a more thorough knowledge of their good qualities might tend materially to increase. There happens just now to be a very favourable opportunity for attempting this. A variety of circumstances have of late called the attention of our neighbours—of France more especially—to the practice of British agriculture. M. de Lavergne, for example, has made its superiority tolerably well known to those of his countrymen who take any interest in the cultivation of the soil. The Emperor himself, from his long residence amongst us, is quite as ready to admit any excellence we may have arrived at in the pursuit. Many of his predilections are, in fact, essentially

English; while as much may be said for many of his subjects. The English thorough-bred horse has long been the ambition of every well turned out Parisian. "The Jockey Club" for fashion and character is amongst the most distinguished of societies in the French capital. Like the Americans, they have begun here again with the horse; and, like that 'cute people, we have little doubt but they may be brought to covet something even beyond him.

In the beginning of this month, as most of our readers are aware, there will be a great agricultural meeting at Paris. There are many, again, who may know but little more than this. There are some who may yet perhaps have to be told that at this meeting there will be a series of classes arranged, as it were, as an especial invitation to the English breeder. We will not venture to declare who is to blame here; but this we may say, that these classes, their several conditions and premiums, are by no means so well known amongst us as they might be. Beyond a short and but occasional advertisement, our information has been little or none. "Further particulars," to be sure, might be had elsewhere upon application. In justice to so laudable a design, and as something like a proper notice to those who may support it, we shall even now enumerate what the chief of these further particulars consist in.

The agricultural meeting begins on the 1st of June: that is, all animals must be *placed* by that day. The second, third, and fourth will be occupied in classing them, and making the awards. On the fifth and sixth the exhibition will be open to the public; on the seventh follows the distribution of the prizes, and on the eighth an optional sale by auction of such stock as may not have previously been disposed of. Let us now take more directly from the prize sheet such opportunities as there may be for our English breeders to introduce themselves and their sorts to a Parisian audience.

Among the premiums, then, the following are open to competition in this country:—

ANIMALS OF BRITISH BREEDS, IMPORTED INTO FRANCE, AND BELONGING EITHER TO NATIVES OR FOREIGNERS.

FIRST CLASS.—CATTLE.

1st Section.—Shorthorned, or improved Durhams.

BULLS.

First prize	£40	0	£108 0
Second do.	36	0	
Third do.	32	0	

COWS.

First prize	£28	0	£ 72 0
Second do.	24	0	
Third do.	20	0	

2nd Section.—Any other Breed.

BULLS.

First prize	£40	0	£136 0
Second do.	36	0	
Third do.	32	0	
Fourth do.	28	0	

COWS.

First prize	£28	0	£ 88 0
Second do.	24	0	
Third do.	20	0	
Fourth do.	16	0	

SECOND CLASS.—SHEEP.

1st Section.—Merinos, Pure or Cross-bred.

RAMS.

First prize	£24	0	£ 78 0
Second do.	20	0	
Third do.	18	0	
Fourth do.	16	0	

EWES (in lots of three).

First prize	£12	0	£ 33 4
Second do.	11	4	
Third do.	10	0	

2nd Section.—Long-woolled Sheep (Dishley, New Leicester, &c.)

RAMS.

First prize	£24	0	£ 78 0
Second do.	20	0	
Third do.	18	0	
Fourth do.	16	0	

EWES (in lots of three).

First prize	£12	0	£ 33 4
Second do.	11	4	
Third do.	10	0	

3rd Section.—Short-woolled Sheep, Southdown, &c.

RAMS.

First prize	£24	0	£ 78 0
Second do.	20	0	
Third do.	18	0	
Fourth do.	16	0	

EWES (in lots of three).

First prize	£12	0	£ 33 4
Second do.	11	4	
Third do.	10	0	

THIRD CLASS.—SWINE.

1st Section.—Large Breeds.

BOARS.

First prize	£12	0	£ 30 0
Second do.	10	0	
Third do.	8	0	

SOWS.

First prize	£ 8	0	£ 15 4
Second do.	7	4	

2nd Section.—Small Breeds.

BOARS.

First prize	£12	0	£ 30 0
Second do.	10	0	
Third do.	8	0	

SOWS.

First prize	£ 8	0	£ 21 4
Second do.	7	4	
Third do.	6	0	

There are other open classes for goats, rabbits, and poultry. We gather further that the bulls and rams must have been born before the 1st of May, 1854; cows and ewes before the 1st of November, 1853; and boars and sows before the 1st of October, 1854. And, again, that an exhibitor must transmit to the Minister of Agriculture at Paris a written declaration, giving the name of the owner, the classes his animals are to be entered in, their origin, breed, age, and the length of time he has possessed them. And that this declaration should have been sent in by Thursday evening, the 24th of May. It is said, however, that some little latitude will be allowed us in carrying out this condition.

As regards the cost of sending stock, we learn that an ox entering France pays a duty of two shillings and elevenpence, and a sheep twopence-halfpenny. Of more importance, that "the expenses for conveying stock, after passing the French frontiers, will be repaid, and general arrangements made for housing and feeding during the whole time of the Exhibition."

We believe that we are only serving both countries in thus making these particulars more generally public. We should have done so before this, had we not supposed they would have been announced in a more official form. It is even now not too late for our breeders to avail themselves of this notice; although we must repeat that we consider it as a mistake that their attention was not more directly invited to that which must so much depend upon their support for its success. Still the intention is a good one; and it will be our own fault if we neglect to avail ourselves of that most excellent of stepping-stones, a good introduction—" Monsieur le Comte—good Mr. Shorthorn; it is the Emperor's wish that you should be better acquainted."

THE LATE SALES OF SHORTHORNS.

SIR,—It may appear a little late to say anything on the subject of some of the late sales of shorthorns, of which I can only speak from report and the notice of it in yours and other papers.

As my desire, however, is the laudable one of gaining information, I hope that some of your correspondents —better informed than the public—will enlighten me as to the cause of the very high prices at which some animals have lately been sold. The buyers at high prices can generally be divided into three classes: First, those who go for long and good pedigree, with fine shape and quality; in short, those who look to every good point. Then come those who pay great attention to the blood or breeding of the animal, but are less particular about the shape. And lastly, we come to those who pay less attention to the blood, if the animal has a few crosses, but who look principally to shape and quality. As should be the case, we usually find the first-named class are the purchasers of the highest-priced animals, since the combination of all the excellencies alone can warrant a very high price. We find, however, that at some of the late sales (that at Hyning and that at Hendon) the highest-priced animals have in neither case the whole of those requisites which are usually so highly prized—first-rate shape, first-rate quality, and first-rate pedigree. In one case, you find the highest price paid for a pedigree because it has a cross or two of Mr. Booth's blood in it, the animal herself being, as I am informed on good authority, by no means first-rate. In the other case you see the 500-guinea cow bring that price not because she is either the best in the herd, or has the best pedigree, but because she belongs to a particular tribe having a few crosses of Bates's blood in it, with nothing remarkable to begin upon. Whereas we see other animals having much of the same blood (such as Lady Blanch by 4th Duke of York, d. by 2nd Duke of Oxford, g.d. by 4th Duke of Northumberland, &c., &c., and her heifer Lady Bates by Duke of Glos'ter) going for about one-fifth the money. Is this owing to a "rage" or "fashion," as you term it, which, like the Cochin China rage or Capel Court mania, will pass off in a few months, leaving the majority of those engaged in it minus a large portion of their investment? or will some good come of it? The question which you ask—" Is this said esteem or fashion justified?" if properly answered would solve the difficulty. You seem disposed to think that it is justified, "as it will be recognized as long as it can be traced." I am disposed to doubt it, as any "esteem" or "fashion" of this nature not founded on intrinsic worth must change; and I am not inclined to think that because a heifer has a couple of crosses of Mr. Booth's blood, or because another belongs to a tribe which has a few Bates' crosses, they are intrinsically worth four or five times as much as other stock, with as fine points and equally purely bred.

I believe that the patrons of the fashionable blood (who seem to have plenty of money), stimulated by the desire of monopolizing it, and of seeing the names of their animals quoted as having been purchased at high figures (giving notoriety both to the stock and the purchasers), have lost sight in a great degree of the valuable properties which gave shorthorns their present reputation, viz., symmetry, quality, and early maturity, which so well fit them for the farmer and the butcher, and of the fact that these are best insured in the offspring by purity of blood, and the possession of all these qualities by the parents. And that I cannot be alone in the opinion that one can breed successfully without giving these extravagant prices for such animals as brought them, you have the fact that you most rarely—I might perhaps say never—see old breeders of reputation giving these prices, though they may be supposed to know fully as much on the subject, and have success fully as much at heart, as younger and less experienced men. Is my opinion well founded or not?

I am, Sir, your obedient servant,

21st May, 1855. A. H.

CROSSING SHEEP.

SIR,—For upwards of fifty years I have seen a great deal of crossing the different kinds of sheep—Leicesters with Leicesters, Leicesters with Cotswolds, Leicesters with Southdowns, and Leicesters with many other kinds of sheep. I have always found the Bakewell or Leicester sheep to improve every kind they have been put to, by giving them the Bakewell barrel form, small bone, and to feed at early maturity. The first cross in most animals has been proved the best; the next cross generally produces less size and weight, except you put a gigantic animal to the first cross: when I say gigantic, I do not mean an animal made a giant with fat flesh, with the head and ears of a dwarf upon him—I mean a giant in frame, when in a lean state, with bone in proportion, aye, and with a head and ears in proportion to his body—a long, thin head, and not a gigantic broad one. Giants do not produce dwarfs, neither do dwarfs produce giants, any more than bulldogs produce greyhounds. It has been proved that a gigantic ram has been produced from a dwarf ewe; at the same time, it was proved that a giant ram lay in the adjoining field, which very easily accounted for the giant being produced from a dwarf. It has always been said that like produces like, and a fine bone denotes a feeding propensity, and a long face and ears, with a Roman nose, denotes a large breed. The breeders of Lincolnshire sheep say that neither the Cotswold nor the Downs mix well with their heavy-woolled sheep, but a dip of the Leicester does wonders. So says the far-famed Mr. Kirkham, of Hagnaby. Mr. Bakewell always said that extremes were bad, and that the middle-sized animal answered the best for profit. But, above all things, said Mr. B., let an animal's make be in proportion—not very large in one point, and very deficient in another. Size had nothing to do with profit; it was not what an animal made, so much as what it cost making. The Lincolnshire farmers are second to no men in the improvement of waste land; the Wolds, Lincoln Heath, and the Fens, for instance: the lowest parts are now drained by steam engines. And the breed of sheep which they have is the most profitable for their county SAMUEL ARNSBY.

86, *Vauxhall-street, Vauxhall, Surrey, May* 22, 1855.

CALENDAR OF AGRICULTURE.

Finish the planting of beet and potatoes from last month, and continue the horse and hand-hoeing of drilled crops. Turn over the heaps of winter-carted dung, and the fermentation will commence and go on. So soon as the land is thoroughly prepared, sow Swedish turnips, purple and yellow-topped, and Laing's and Matson's if the encouragement be superior, and follow with Aberdeen yellows. The dung must be equally moist—no dry materials on any account. Open the drills with the common plough, lay in the dung from one-horse carts, spread and cover the dung, and sow the seeds immediately. If the land be cloddy, and the weather dry, roll the drills without delay with a weight of 6 to 10 cwt., to keep and produce moisture: in damp weather roll more lightly, or not at all. In turnip-sowing, three things are to be remembered—land pulverized and cleaned; dung well prepared, regularly spread; and dispatch in bringing the land, dung, and turnip-seeds into immediate contact. The more these means are neglected, the more the crops partake of haphazard.

In the very wettest weather in which work can be performed, plant cabbages, kohl-rabi, savoys, and winter brocoli from the seed-bed, on drills three feet apart, and the plants two feet asunder. Strong lands, too stiff for growing turnips, suit well; dung heavily with very moist manure. Fill up the blanks carefully with fresh plants; sow rape preparatory for wheat, to be consumed on the ground by sheep, and the early tankard and store turnips for early use, and to admit a winter crop.

Go on with paring and burning rough lands; continue vigorously the preparation of turnip lands, and at convenience the ploughing of wheat fallows. This month and the two preceding are the key of the whole year. If farm work gets behind, no subsequent exertions will recover it.

Most of the stall-fed cattle will now be disposed of—some to the butchers, and the inferior ones for more grazing to fit them for sale. Put the milch cows to grass in a homestead field, well watered and sheltered (a large shed is indispensable); the store cattle to the pastures, and arranged by age and condition. Have all fences and gates in proper order, and provide water in every field. The oldest calves may now go to the grass paddock; give clover and vetches in addition, and one suckling daily, to wean them by degrees.

Winter food being finished, grain and oilcake may be continued to the sheep. Look to the latest lambs, which must have the best encouragement, and strive, both by feeding and management, to have all stock alike in size and quality: judgment is well shown on these points.

Continue the folding of sheep (the store flock only) on arable lands and bare pastures; put ewes and lambs, and the most forward fattening flock, on rye and winter vetches; cut and give the food in racks; carry to the yards part of the crops for soiling work horses, calves, lean cattle, and store pigs. Have the yards dry, and provide ample littering—well repaid by the dung produced; spare no trouble or any reasonable expense in procuring that most essential of all articles in farming. As the crops are eaten off, plough the land for turnips.

Colts should be gelded before the warm weather sets in—better during the previous autumn. In the end of the month put mares to the stallion, though, as with other animals, breeding may go on during all seasons, only requiring some more care and attention in nurturing the progeny.

Wash sheep by hand in a strong clear running stream. If the maggot-fly appear, sprinkle the animal from head to tail from a dredging-box, with a mixture of hellebore-root powder and black brimstone 74lbs. to 1½lbs.

Young plantations of hops may be dug this month, and the bine tied to the poles.

Young quicksets may be weeded if much choked; if not, do not expose them on dry soils and hot situations to be scorched, and often killed. Cut oak trees for bark early in the month; strip and dry it quickly.

Finish the sowing of grass seeds; use the broadcast machine 10 feet long; follow with light harrow, and roll heavily.

Shut up the watered meadows intended for hay.

SHEEP-WORRYING.—The decision lately given by the Judicial Committee of the House of Lords has settled the point of law relative to this question, viz., That the owner of the sheep worried cannot recover compensation from the owner of the dog, whom he may have caught in the very act of destroying his flock, *except the dog may have been previously convicted of a like atrocious offence.* This may be a figment of law; but it is void of common sense. What man of common sense would permit his dog (however valuable he may be) to live, knowing him to be addicted to this shameful vice? and what a difficult task it is to detect such a brute at such work, taking place, as it almost invariably does, in the dead of the night! Common sense dictates this axiom, That every owner ought to be held responsible for the acts of his own animals. If his pig enters my garden and eats my potatoes, I can recover: if his dog enters my field and eats my sheep, I must bear the loss!! The sooner such an anomaly in British law is ended the better. What an annoyance to reside near a town infested by whole herds of prowling dogs, your flocks and other animals at their mercy, with but a very remote chance of compensation for the most extensive injury you may sustain! Surely this strange thing cannot longer remain as it is, now it is fully known. The law must be altered to meet the spirit of the times. Feudal absurdities cannot exist in this kingdom much longer.

METEOROLOGICAL DIARY.

Barometer.			Thermometer.			Wind and State.		Atmosphere.			Weat'r.
1855.	8 a.m in. cts.	10p.m. in. cts.	Min.	Max.	10p.m.	Direction.	Force.	8 a.m.	2 p.m.	10p.m.	
Mar.22	28.94	29.90	33	37	34	E. N. E.	brisk	cloudy	cloudy	cloudy	showery
23	29.0	29.20	32	36	33	North	brisk	cloudy	cloudy	cloudy	dry
24	29.22	29.32	29	37	33	N. East	lively	cloudy	cloudy	cloudy	dry
25	29.38	29.58	27	42	30	N. East	lively	fine	sun	fine	dry
26	29.60	29.70	24	42	35	N. East	gentle	fine	sun	cloudy	dry
27	29.74	29.91	32	48	38	N. West	gentle	cloudy	fine	fine	showery
28	30.01	30.24	33	40	35	N.-Easterly	gentle	cloudy	cloudy	cloudy	s. hail
29	30.39	30.41	31	46	36	N. East	fresh	cloudy	sun	cloudy	dry
30	30.43	30.40	30	48	34	E. N. E.	gentle	haze	fine	cloudy	dry
31	30.39	30.35	32	52	33	E. N. E.	airy	cloudy	sun	fine	dry
April 1	30.31	30.20	27½	46	38	E. N. E.	gentle	cloudy	fine	fine	dry
2	29.89	29.89	26	50	36	E. S. E.	gentle	cloudy	sun	fine	dry
3	29.80	29.60	32	48	42	S. or by West	gentle	fine	cloudy	cloudy	rain
4	29.60	29.94	33	58	38	N. East	gentle	fine	sun	fine	dry
5	30.02	30 06	29	54	43	Variable	gentle	fine	sun	fine	dry
6	30.10	30.12	40	62	54	W. by S.	gentle	fine	sun	cloudy	dry
7	30.13	30.05	47	61	48	W. by N.	gentle	cloudy	sun	fine	dry
8	30.06	30.06	37	51	43	W. by N.	brisk	cloudy	cloudy	cloudy	rain
9	29.80	29.50	40	56	48	W. by S.	strong	cloudy	cloudy	cloudy	rain
10	29.38	29.30	37	51	42	W. N. W.	strong	fine	sun	fine	showery
11	29.42	29.52	44	55½	46	West	lively	cloudy	cloudy	cloudy	rain
12	29.52	29.62	43	60	49	W. by N.	lively	fine	sun	cloudy	dry
13	29.61	29.61	46	53	48	S. by West	various	cloudy	cloudy	cloudy	drizzly
14	29.83	30.04	43	63	50	W., S.	fresh	fine	sun	cloudy	dry
15	30.12	30.22	44	65	54	W., S.	fresh	fine	sun	cloudy	dry
16	30.26	30.30	51	73	57	West, N. E.	gentle	haze	sun	cloudy	dry
17	30.30	30.35	47	71	46	East	fresh	fine	sun	clear	dry
18	30.35	30.25	37	62	42	East	fresh	fine	sun	clear	dry
19	30.16	30.05	31	68	47	East	gentle	fine	sun	clear	dry
20	30.16	30.33	42	67	45	Nly., Easterly	fresh	cloudy	sun	clear	dry

ESTIMATED AVERAGES OF APRIL.

Barometer.		Thermometer.		
Highest	Lowest.	High.	Low.	Mean.
30.54	29.20	74	29	*49.9

REAL AVERAGE TEMPERATURE OF THE PERIOD

Highest.	Lowest.	Mean.
53.4	32.6	*43 (6.9 too low)

WEATHER AND PHENOMENA.

March 22. Cold and dreary.—23. Clouds more defined.—24. Drying wind, lull at night.—25. Improved, glowing sunset.—26. Frost, rapid thaw.—27. Heavy clouds, a slight sprinkling.—28. Some heavy showers.—29. Much finer.—30. Fine sunset.—31. Most beautiful.

LUNATION.—First quarter, 11 h. 25 m. morning.

April 1. Hoar frost till 9 a.m.—2. Powerful sun, rocky clouds.—3. Small rain.—4. Warm and sunny afternoon.—5 Appearance of change; night overcast.—6, 7. Spring weather.—8, 9. Cold, windy, and overcast.—10. Very cold; hail shower.—11, 12. Lively air, and fine.—13. Damp; some drizzle.—14. Fine; sun hot; it rose to 89° on the 7th.—15. Superb red sunset.—16. Cloudless after haze.—17, 18. Hot sun, with lively air.

LUNATIONS.—Full Moon, 2nd day, 2 h. 28 m. afternoon. Last quarter, 9th day, 9 h. 60 m. afternoon. New moon, 16th day, 3 h. 5 m. afternoon.

REMARKS CONNECTED WITH AGRICULTURE.

The extremely low temperature for the season till April 6th had retarded vegetation. On that day a mild change commenced, and the heat was several degrees in excess till the 21st. On the 8th some rain fell; the weather remained changeable for four days. The total amount of wet did not exceed 11-tenths of an inch, and we had no greater supply for some weeks. Drought prevailed. Verdure made *slow* advances; yet nature was not wholly torpid. Buds enlarge, and the cereals are visible. No opinion of the future can yet be justified.

Croydon. J. TOWERS.

METEOROLOGICAL DIARY.

BAROMETER.			THERMOMETER.			WIND.		ATMOSPHERE.			WEAT'R.
1855.	8 a.m. In. cts.	10p.m. In. cts.	Min.	Max.	10p.m.	Direction.	Force.	8 a.m.	2 p.m.	10 p.m.	
Apr.21	30.45	30.48	34	60	38	N.E.	fresh	fine	sun	fine	dry
22	30.50	30.47	32	48	42	E. by N.	fresh	fine	sun	clear	dry
23	30.47	30.40	35	63	42	N.E.	brisk	fine	sun	fine	dry
24	30.24	30.20	34	67	48	N.W. and N.E.	var.	fine	sun	cloudy	dry
25	30.15	30.22	41½	54	42	North	brisk	fine	sun	cloudy	dry
26	30.21	30.21	35	59	47	North	gentle	fine	sun	fine	dry
27	30.20	30.14	39	58	45	N.E. and S.W.	var.	fine	sun	fine	dry
28	30.09	30.16	38	58	42	N.E.	brisk	cloudy	cloudy	cloudy	dry
29	30.16	30.21	38	56	42	North	brisk	cloudy	sun	cloudy	dry
30	30.22	30.20	40½	55	44	N.W. and N.E.	brisk	cloudy	cloudy	cloudy	rain
May 1	30.10	30.10	39	54	41	N.E.	fresh	fine	sun	fine	dry
2	30.07	29.90	36	63	43	E.N.E.	fresh	fine	sun	clear	dry
3	29.67	29.65	30	63	43	E.N.E.	strong	fine	sun	clear	dry
4	29.65	29.85	38	48	35	E.N.E.	forcibl.	fine	cloudy	clear	dry
5	29.90	29.96	30	60	43	E.N.E.	fresh	fine	sun	fine	dry
6	29.95	29.95	35	61	52	Westerly	fresh	fine	sun	cloudy	dry
7	29.97	29.69	47	57	48	S. West	fresh	fine	fine	fine	showery
8	29.70	29.99	41	56	40	N. Westerly	fresh	fine	cloudy	cloudy	showery
9	30.00	29.72	33	59	46	South	brisk	fine	cloudy	cloudy	showery
10	29.55	29.55	42	60	51	W. or by N.	brisk	fine	cloudy	cloudy	showery
11	29.56	29.61	45	56	44	N. or by W.	gentle	fine	cloudy	cloudy	showery
12	29.77	29.85	37	54	40	N.W.	gentle	fine	sun	fine	dry
13	29.66	29.38	36	44	44	S. East	lively	cloudy	cloudy	cloudy	rain
14	29.66	29.67	36	52	44	N.W.	gentle	cloudy	fine	cloudy	dry
15	29.58	29.58	37	46	45	N.W.	gentle	cloudy	fine	cloudy	dry
16	29.66	29.81	42	50	42	N.W.	airy	cloudy	fine	fine	dry
17	29.88	30.00	37	60	47	Var., N.	gentle	cloudy	fine	cloudy	dry
18	30.10	30.10	38	61	49	Var., N.	fresh	fine	cloudy	fine	dry
19	30.07	29.92	47	65	55	S. by E.	fresh	fine	sun	fine	dry
20	29.85	29.87	50	66	52	East	fresh	fine	sun	cloudy	showery
21	29.87	29.87	42	52	48	N. by W.	gentle	cloudy	cloudy	cloudy	showery

ESTIMATED AVERAGES OF MAY.

Barometer.		Thermometer.		
Highest.	Lowest.	High.	Low.	Mean.
30.38	29.160	70	33	54

REAL AVERAGE TEMPERATURE OF THE PERIOD.

Highest.	Lowest.	Mean.
56.3	38.064	42.18

WEATHER AND PHENOMENA.

April 22. Some evening clouds.—23. Lofty haze, and faint lunar halo.—24. Rime, then warmer, with change of wind.—25. Clouds, passing off by 4 h. p.m.—26. Balmy and fine.—27. Nearly calm; another faint halo.—28. Overcast; cutting wind.—29. Same.—30. Overcast; a sprinkle at 7 a.m.

LUNATION.—First quarter at 5 h. 57 min., morning.

May 1. Keen, drying day.—2, 3, 4. Cold and piercing wind.—5. Ice; severe till sunrise.—6. Change for rain.—7. Strong wind.—8 to 14, inclusive. Rain, more or less.—15. More in night, to the 20: no rain here, but some at Greenwich.—21. Fine in general, but cold; two small showers.

LUNATIONS.—Full, 2nd, 4 h. 3 m. a.m. Last quarter, 9th, 3 h. 1 m. a.m. New moon, 16th, 2 h. 13 m. a.m.

REMARKS CONNECTED WITH AGRICULTURE.

Our table proves the continuance of low temperature; the averages evince its excess; yet nature progresses, and the verdure of cereals and of the meadows is gratifying. The rains of the second week, though scarcely amounting to 1 inch superficial (sinking, however, many inches), has told its power; and should more speedily follow, with 5 or 6 degrees increase in warmth, we have great hopes of a good hay crop. Frosts have occurred; but no damage has been sustained, and there is a promise of fruit.

Croydon, May 22. J. TOWERS.

AGRICULTURAL REPORTS.

GENERAL AGRICULTURAL REPORT FOR MAY.

During the greater portion of this month, the weather in nearly all parts of the United Kingdom has been extremely cold and ungenial for the time of year: hence, vegetation has made very little progress, and the crops generally are very backward. As the fields have not presented so favourable an aspect as could be desired, some anxiety has been manifested as to the probable produce of the wheat crop; and some parties have gone the length of stating that the produce must be small, compared with last year. We, however, are not prepared to assert either that our prospects are bad, or that we have any positive grounds for assuming that we shall have a deficient yield. It is quite true that the wheats are not so forward as we have frequently witnessed them at this period, and that the colour of the plant is far from inviting; but our surprise is, that they look so well, sidering the long continuance of unfavourable and unvegetative weather. There is one feature requiring particular notice—viz., the unusually small breadths of land which it has been found necessary to resow this year with wheat: and another is, that the extent under wheat-culture is decidedly in excess of last year, which it will be recollected was the largest on record. Whether the crop be a large or small one as regards the *acreable* yield, the fact that we have a large breadth of land under wheat must have considerable weight both with the home growers and foreign importers.

Considerable discussion has lately sprung up respecting the quantity of wheat now in the hands of our farmers. The enormous deliveries going on week by week ever since the close of last harvest, up to the present time, have induced the opinion in some quarters that the supply is extremely small, and wholly inadequate to meet the usual demand up to the end of August. Those who argue and operate upon this assumption are, in our judgment, likely to lead themselves into a serious error. Admitting that the sales have been extremely heavy, we must not forget that we grew an immense crop in 1854, and that, too, of the very finest quality. This is a point fully explained by us some months since; and our views have been *more* than borne out by facts. The most remarkable circumstance connected with last year's crop, and which has told so much upon supply, was the immense yield of wheat upon the light and inferior soils; indeed, we may assert, without fear of contradiction, that upon many of them nearly double the quantity of wheat was grown last year, compared with 1853. This we have in many instances discovered from the quantities of wheat which have been sold from them. At this crisis, this is a feature of no ordinary importance; and we may venture to intimate that there is decidedly more English wheat in the country yet undisposed of and in stack than at the corresponding period in 1854, and that the supply is even in excess of 1853. Let it be understood that we are not assuming for a moment that we shall not require extensive importations of foreign grain, to meet consumption between this and the close of harvest operations; but our firm conviction is that, notwithstanding the war with Russia, and the great falling off in the shipment of breadstuffs from the United States, the price of English grain has nearly, or quite, reached its maximum point.

As regards the appearance of the spring crops, we may observe that it is tolerably satisfactory. Barley is not looking quite so well as could be desired; but no doubt the fine rains which fell towards the close of the month, aided by the beneficial change in the temperature, will speedily work an alteration for the better. Oats, beans, and peas show a fair prospect of a crop, though it would be premature to offer any decided opinion respecting them at this early period. The stocks on hand have now become much reduced; but we understand that large supplies may be looked for from the continent and elsewhere during the greater portion of the year.

Judging from the present appearances of the pastures, which are unusually bare of grass, there is every indication of a short crop of hay. Already, meadow and clover have sold at enhanced rates, notwithstanding that a fair average supply is still left, and it is possible that higher rates will shortly be realized for fine qualities. The extreme backwardness of the grass has been severely felt in the whole of our grazing districts, and many of the large flockmasters have been compelled to purchase very large quantities of hay to meet the necessities of their stock. This large outlay of capital will, as a matter of course, operate seriously upon profits; besides which, numerous flocks of sheep, in little more than a half-fat state, have been sold during the month, owing to the high value of dry food. This circumstance is to be much regretted, because this drain must have considerable influence upon the future supply of animal food. The supplies of beasts, especially those received in the metropolis from Norfolk and Scotland, have turned out wonderfully fine, and have carried a large amount of internal fat.

The public sales of colonial wool have gone off with some animation, and prices have been on the advance. The comparative activity in the biddings has been in some measure produced by the light stocks held by the leading manufacturers, the slight improvement in the trade in Manchester and elsewhere, and the great abundance and low value of money. English wools have continued dull in sale, and a further slight decline has taken place in the quotations. The supply of both old and new wools still on hand is large, and the latter are offering at 1s. per lb. For shipment to the continent, only a limited business has taken place.

There have been scarcely any arrivals of potatoes from the continent; but the supplies of both English and Scotch have continued unusually large, and of very superior quality. This circumstance accounts for the comparative inactivity in the corn trade; as yet, large supplies have to come forward; nevertheless, good samples are expected to be selling at a good price during the remainder of the season now rapidly drawing to a close.

In Ireland and Scotland, the corn trade has been less active, yet no material change has taken place in prices. The stocks of grain are represented as still seasonably good.

During the month, about 10,000 tons of guano have arrived in the metropolis from various quarters; but chiefly from Callao and the Chincha Islands. Most of the cargoes have been sold at very full prices, and over 6,000 tons have been taken on continental account.

REVIEW OF THE CATTLE TRADE DURING THE PAST MONTH.

Although, from their comparative abundance and good quality, the value of beasts in Smithfield as well as in most of the local markets has had a downward tendency, the cattle trade has been in a healthy state. It has been a subject of general remark that, considering the period of the year, a much larger number of really fine beasts has come to hand from Norfolk and Scotland than has been almost ever recollected. The supplies of English sheep have been good as to number, but very deficient in quality; hence all good and useful sheep have sold briskly, and prices may be considered 4d. per 8 lb. higher than in April. The activity in the mutton trade has been increased from the limited supplies which have come to hand from the Continent, with little or no prospect of any increase in them this year, owing to the deficient numbers now in Holland. It is, therefore, most probable that mutton will fetch a high price during the greater portion of the year. Lambs and calves have been mostly in poor condition, and prime animals have consequently realized high rates.

The great scarcity of pasture food has been severely felt in the whole of our flock districts, and many graziers and others have been compelled to purchase very large quantities of dry food to supply their stock; whilst from some counties numerous flocks of sheep have been received in the metropolis in a half-fat state.

The following are the imports into London:—

	Head.
Beasts	3,194
Sheep	2,211
Lambs	95
Calves	1,559
Pigs	84
Total......	7,103

In the same month in 1854 we received 4,708; in 1853, 13,007; in 1852, 8,506; in 1851, 9,214; in 1850, 6,060; in 1849, 5,465; and in 1848, 7,904 head.

There have been a few Scots disposed of in Smithfield, at 4s. 8d. per 8lbs.; but the top figure on the 28th was very little above 4s. 4d. per 8 lbs. The best old Downs have readily produced 5s. out of the wool; and some prime lambs have realized as much as 7s. per 8 lbs.

The total supplies shewn have been—	Head.
Beasts	19,947
Cows...........................	410
Sheep and lambs..................	113,600
Calves..........................	2,470
Pigs	2,590

COMPARISON OF SUPPLIES.

	May, 1851.		May, 1852.		May, 1853.		May, 1854.
Beasts	19,464	..	17,839	..	21,346	..	20,831
Cows.........	460	..	476	..	500	..	576
Sheep & lambs	133,862	..	118,034	..	122,250	..	124,824
Calves	1,855	..	2,393	..	2,041	..	2,146
Pigs	2,780	..	2,655	..	2,700	..	2,435

The arrivals from Norfolk, Suffolk, Essex, and Cambridgeshire, since our last, have amounted to 10,700 Scots and shorthorns; from other parts of England, 2,000 of various breeds; and from Scotland, 2,325 horned and polled Scots, about three-fourths of the latter per railway.

The following quotations shew the highest and lowest range of value during the month:—

Per 8 lbs. to sink the offal.

	s.	d.		s.	d.
Beef ....from	3	0	to	4	8
Mutton	3	2		5	0
Lamb	5	2		6	10
Veal........................	4	0		5	4
Pork.......................	3	0		4	4

COMPARISON OF PRICES.

	May, 1851.					May, 1852.			
	s.	d.	s.	d.		s.	d.	s.	d.
Beef	2	4 to	3	6	......	2	4 to	3	10
Mutton	2	6	4	0	......	2	6	3	10
Lamb......	4	8	5	10	......	4	2	5	4
Veal	3	0	3	8	......	3	0	4	4
Pork	2	8	3	8	......	2	4	3	6

	May, 1853.					May, 1854.			
	s.	d.	s.	d.		s.	d.	s.	d.
Beef	3	0	to 4	6	......	3	2	to 4	10
Mutton	3	4	4	8	......	3	4	5	0
Lamb......	5	0	6	4	......	5	4	6	8
Veal	3	10	5	0	......	4	2	5	8
Pork	3	0	4	4	......	3	6	4	8

Newgate and Leadenhall markets have been fairly supplied with each kind of meat. The trade has been by no means active, as follows:—Beef from 3s. to 4s. 2d.; mutton, 3s. 2d. to 4s. 8d.; lamb, 5s. to 6s. 6d.; veal, 3s. 10d. to 4s. 10d.; and pork, 3s. 4d. to 4s. 4d. per 8lbs. by the carcass.

REVIEW OF THE CORN TRADE

DURING THE MONTH OF MAY.

We closed our prefatory remarks of last month's review by alluding to the establishment of the telegraphic line having been completed to the Crimea, and that an early announcement of every important event might be expected. Much anxiety continued to be evinced by the public on the subject of the war with Russia, and in the early part of this month some communications were made of a satisfactory nature, and the allies on the whole have been gainers; but latterly the information has not been given freely. There is, however, nothing to indicate a restoration of peace, and fighting must be continued yet awhile.

Russian supplies of grain cannot now be reckoned on from either the Black Sea or the Baltic, every port being strictly blockaded, and we are consequently thrown on our own resources a good deal, looking to the northern ports of Europe for supplies to a moderate extent so long as their stocks last; from thence we shall get the finer qualities of wheat, and from Egypt a liberal quantity of inferior stuff may come forward, as well as a good supply of beans. From more distant countries, little or nothing can be looked for until after next harvest, and the extent then to be expected will mainly depend on the result of the yield throughout Europe; we shall thus continue to be in a somewhat critical position until we have secured our own crop, and learnt the particulars of this year's produce in all parts of the world; our markets will therefore soon feel any falling off in the home supplies.

During the first week of the month the trade had become much excited, and the advance on English wheat was 6s. to 8s. per qr. in Mark-lane: this sudden movement had great effect on all markets of the interior, which were ready for such an enhancement, buyers and sellers having been all on the *qui vive* for the result of the conferences at Vienna, and the moment these were at an end, an activity took place in every department not witnessed for some time, as all parties being out of stock, merchants and millers vied with each other who could be the first to secure an additional quantity, for the farmers have known their position too long not to be able to take advantage of these altered views of everybody, and the agricultural markets were all very active, some of them up 8s. to 10s. per qr., millers being driven to follow the advance or stop their mills. The supplies generally were pretty good, all appearing to have been sold that was brought forward. There was also a good demand for foreign wheat, prices being 6s. to 8s. per qr. higher for every description of useful quality. The imports were unimportant, consisting of small cargoes from the north of Europe, amounting to only 4,614 qrs., against 52,047 qrs. the corresponding week of last year. The London average registered 72s. 8d. on 4,664 qrs. The returns of the 290 towns amounted to 98,446 qrs. at 68s. 8d., against 79s. 11d. on 54,353 qrs. the corresponding week of last year. Select and heavy red English touched 80s. per qr., and the top price of white in Mark-lane was 86s. per qr.

At Mark-lane, on Monday the 7th May, it appeared as if the buyers had gone on too fast the previous week, and a pause resulted with most parties; but although the supply was short, the town millers purchased very little wheat, the sales effected being generally 1s. to 2s. per qr. lower. The advance was too sudden and important to be lasting; had the market gone up quietly a few shillings, it might have been better for trade. A few runs of Kentish white were taken for Ireland, but the Essex factors would not submit to the decline required by the general buyers, and some quantity was left over unsold for future markets. The holders of foreign wheat would not accept any material reduction, and little business was entered into at that day's market. The imports were on the increase, consisting of 710 qrs. from Aarhuus, 302 qrs. from Antwerp, 615 qrs. from Bilboa, 1,038 qrs. from Bremen, 2,109 qrs. from Danzig, 130 qrs. from Faaborg, 1,588 qrs. from Hamburg, 339 qrs. from Harlingen, 480 qrs. from Konigsberg, 250 qrs. from Landscrona, 370 qrs. from Norkoping, 300 qrs. from Ottendorf, 1,415 qrs.

from Stolpemund, 1,110 qrs. from Stralsund, 170 qrs. from Svendborg, 1,250 qrs. from Wolgast, with a few other small lots, making a total of 12,281 qrs., against 67,726 qrs. the corresponding week of last year. The London average registered 73s. 4d. on 4,021 qrs. The general returns were 92,190 qrs. at 68s. 4d., against 70,581 qrs. at 79s. 5d. the corresponding week of last year. In all the agricultural districts there was a subdued tone, the buyers taking very little unless they could make their purchases at some reduction; but the farmers seeing no reason for so soon moving the *wrong* way, many of them preferred to look on a short time longer, before they fell into the notions of the buyers, and at the close of the week trade braced up steadily again.

The advices received at Mark-lane on Monday the 14th instant being of an improved character, some of our leading millers came forward more willingly, and cleared the Essex stands effectually, giving for choice samples of white wheat 1s. and 2s. per qr. enhancement in value, and all samples of red improved 1s. per qr.; thus the market nearly recovered what it had lost the previous week for all good qualities. Prime red reached 80s. per qr., and select white up to 86s. per qr., prices which will satisfy all farmers, and must be considered highly remunerative with the splendid crop of last harvest; and it is a glorious circumstance for the country that they can still make such large deliveries as they are now doing weekly. A similar improvement took place in the value of foreign wheat, although the demand for this description was not so active as that experienced for English. The imports consisted of 142 qrs. from Antwerp, 633 qrs. from Baltimore, 1,380 qrs. from the East Indies, 105 qrs. from Genoa, 28 qrs. from Grebbestadt, 1,964 qrs. from Hamburg, 1,497 qrs. from Harlingen, 100 qrs. from Helsinborg, 403 qrs. from Limpias, 110 qrs. from Lisbon, 950 qrs. from Oporto, 550 qrs. from Rostock, 352 qrs. from Rotterdam, 3 qrs. from Skive, 315 qrs. from Stege, and 2,608 yrs. from Stralsund, making a total of 11,140 qrs., against 21,940 qrs. the corresponding week of the past year. The London average registered 80s. 4d. on 3,416 yrs. The general returns were 102,082 qrs. at 69s. 5d., against 66,511 qrs. at 79s. 9d. the corresponding week of last year. This is the largest return since December last, and good deliveries will most probably be kept up until haymaking commences, the more so if prices remain equally high as at present; for come what may hereafter, the agriculturists will be encouraged to supply the markets whilst the trade is so active and animated.

The supply of wheat from Essex and Kent at Mark-lane on Monday the 21st instant was only small at the opening of the market, but received some accession later in the day from the Essex merchants; very high prices were at first asked, which had a tendency to check the demand, the town millers not feeling disposed to give the advance demanded; and although the advices of all markets held on Saturday were higher and encouraging, still there appeared no sufficient cause for a further rise, and trade, assuming a degree of dulness, could not be considered better than on Friday, when about 1s. per qr. enhancement was obtained for choice samples; a few Kentish runs were taken off, but generally those from Essex were left unsold for future markets. The transactions in foreign wheat were only to a trifling extent, from the firmness of the holders, and prices were about the same as on that day se'nnight. The imports consisted of 315 qrs. from Amsterdam, 450 qrs. from Antwerp, 2,350 qrs. from Dantzig, 67 qrs. from Dordt, 292 qrs. from the East Indies, 495 qrs. from Hamburg, 623 qrs. from Harlingen, 590 qrs. from Limpios, 175 qrs. from Memel, 950 qrs. from Oporto, 685 qrs. from Pillau, 1,737 qrs. from Rostock, 2,198 qrs. from Rotterdam, 40 qrs. from Seville, 1,400 qrs. from Stralsund, 180 qrs. from Tonning, and 620 qrs. from Wismar, making a total of 13,167 qrs., against 39,514 qrs. the corresponding week of last year. The London average registered 79s. 6d. on 3,436 qrs. The general returns were 96,727 qrs. at 73s. 4d., against 57,450 qrs. at 78s. 9d. the same week last year, showing a continuance of good deliveries, and the public will not yet complain of being restricted in quantity if satisfactory prices are kept up.

The quantity of wheat brought forward at Mark-lane on Monday the 28th instant, was rather limited from Essex and Kent. The town millers purchased it slowly, and paid within about 1s. per qr. of the rates of the previous week; the favourable change in the weather, and large imports of foreign, caused this dulness, although the town millers require fresh thrashed samples. There was a limited demand for foreign wheat at 1s. to 2s. per qr. reduction in price, so much of the present supply being of a poor quality, and in bad condition. The imports consisted of 6,776 qrs. from Rostock, 4,735 qrs. from Stralsund, 3,370 qrs. from Wolgast, 2,150 qrs. from Copenhagen, 1,982 qrs. from Danzig, 1,084 qrs. from Stettin, 1,020 qrs. from Landscrona, 835 qrs. from Greifswald, 4,178 qrs. from Hambro', 1,059 qrs. from Harlingen, 1,235 qrs. from Antwerp, 1,619 qrs. from Oporto, 1,400 qrs. from Alexandria, and many smaller quantities from other ports, making together 35,604, against 47,006 qrs. the corresponding week of last year. The London average registered 81s. 7d. on 4,748 qrs. The general returns were 97,879 qrs. at 76s. 1d., against

54,931 qrs. at 78s. 2d. the corresponding week of last year. The averages are now approaching those of last year as to price, and probably will soon be over them, whilst the quantity is nearly doubled, and from present deliveries the returns are likely to be kept up at least a few weeks longer. It is not often that our agriculturists meet with the same good fortune as has existed since last harvest —a bountiful crop and high prices together.

There have been more fluctuations in the article of flour than for months past, and the cold state of the weather in a month usually much dreaded has been conducive to all doubtful parcels remaining in condition, and this enabled the holders to take advantage of the improved demand as well as price. In the first week, town-made was put up 5s. per sack, the top price being 70s. Households advanced to 60s., and country marks generally realized 4s. to 5s. per sack more money; Norfolks commanding 55s. per sack. The second week, there was rather a lull, and some sorts were easier to purchase, Norfolks being obtainable at 1s. per sack lower rates. The third week, trade braced up a little, and rather more money was again obtained. There have been fair arrivals of Spanish, the quality of which is generally fine, and the best coloured parcels realized 63s. per sack, varying to 62s. for moderately fine descriptions. From America scarcely any has come in, and this article being worth more in New York than either in London or Liverpool, there is no prospect of any quantity being received until after harvest. We believe some has been shipped for New York, from Liverpool; though this may turn out a risky adventure, now that the canals in that country are open; at any rate, this shipment confirms the opinion expressed by some parties well informed on the subject, which we alluded to in our last month's review. The third week, prices were higher for town households, 61s. to 62s. per sack having been obtained, and prime country marks in proportion. Norfolks sold readily at 56s. per sack, and at the latter end of the month business was not quite so brisk as during the previous week; but the best fresh country marks were placed pretty readily, and the demand for this decription seems likely to be kept up throughout the summer months.

There has been a firmer trade for barley throughout the month, and prices have been well kept up: in some instances an advance of 1s per qr. has been established on fine qualities. The weather having continued favourable for the malting process, some maltsters have continued at work steadily, and have been encouraged in this from having had an increased sale for malt; the best descriptions of which article have been enhanced, fine Ware and Kingston being now worth 72s. per qr., with more buyers this, than any previous month, for some time past, and there is now some hope of their getting off their stocks tolerably well at last. The deliveries from the farmers have steadily fallen off, and are now very limited, and soon the stock of English will be exhausted. The imports of foreign have been limited, but a few more cargoes have dropped in towards the close, from the North of Europe, and more may now be expected from thence, although from the South not much comes in, this article being diverted to the Crimea, for fodder for horses, from various ports, which demand is likely to be kept up until the cessation of hostilities. Our distillers have latterly shown more disposition to get into stock, probably with a view to hold the finer qualities over, until the new Spirit Act comes into operation, as from and after the first October next they will be enabled to make malt in bond, and pay the duty on the spirits, with the permission of using sugar in a similar way: what effect this will have on the prices of barley next season it is difficult to say; but it cannot be against the agriculturists, unless the value of sugar should be very low, so as to throw a larger consumption on to it, to the prejudice of the former article; and perhaps the expense of altering their premises entirely will induce the distillers to employ the maltsters, from whom they had previously purchased the article, to make it, and thus make up the loss of any profit in previously selling the article to them: this being the case, they will most probably have to enter all the maltings thus used in their own names. The last four weeks' averages were 31s. 6d. on 36,505 qrs., 31s. 3d. on 29,868 qrs, 31s. 10d. on 27,315 qrs., and 32s. 5d. on 20,093 qrs.

The supplies of oats from our own coast throughout the month have been of the most trivial character, somewhat more from Scotland; but liberal from Ireland, and large from foreign ports. In the first week they were the shortest of home grown, having been only 40 qrs. coastwise, 726 qrs. from Scotland, 900 qrs. from Ireland, 1,220 qrs. by the Eastern Counties Railway, and 1,565 qrs. by the Great Northern. Notwithstanding the liberal quantity of foreign, the market generally being in an excited state, the trade was brisk at an advance of 2s. per qr., dealers and consumers being alike free buyers. The second week, there were 229 qrs. coastwise, 732 qrs. from Scotland, 1,657 qrs. by the Eastern Counties Railway, 832 qrs. by the Great Northern; with 9,200 qrs. from Ireland, and 37,087 qrs. from foreign ports. With such an accession of foreign supply, the market became duller, and some sorts were sold at a reduction of 6d. to 1s. per qr. The supplies of the third week were liberal, but not so large as the previous one; trade was rather slow, and foreign samples of feed were mostly 6d. to 1s. per qr. cheaper. The next week there were again liberal supplies, consisting of 448 qrs. coastwise, 1,900 qrs. from Ireland, 1,347 qrs. by the Eastern Counties, 1,245 qrs. by the Great Northern, and 24,291 qrs. from foreign ports. There was no material variation in value of good corn, but the large dealers bought limited quantities on expectation of considerable supplies now coming in from the North of Europe, and the improved state of the weather or a higher temperature, and nice rains occasionally; and during the remainder of this week, the supplies of English were 1,170 qrs., of Irish, 4.600 qrs., and foreign, 34,750 qrs., offering a good choice to every description of buyer, and prices closed tolerably firm, with a somewhat extensive demand for sweet and heavy parcels of foreign feed. The averages were 25s. 9d. on 20,995 qrs., 26s. on 17,203 qrs., 26s. 11d. on 17,401 qrs., and 27s. 9d. on 12,394 quarters.

The improving prices in beans have encouraged the farmers to find somewhat more of this article, and the consumption has rather increased than diminished. Fine samples have come forward in the best condition, and sales have in consequence been readily effected. There have been tolerably fair imports of Egyptian at this port, Liverpool, and Glasgow; and a pretty ready sale has been experienced at all these ports: this description having improved in value almost as much as home-grown, importers have realized good profits on the adventures of Alexandrian produce. From the North of Europe we have received very few, and cannot expect many from thence, owing to the reduced stocks in all the Baltic ports. A few small cargoes may drop in from Freisland and Hanoverian ports, but there is no abundance of this article in any country this year, and stocks here will most probably be thoroughly used up before next crop can be secured. The weekly averages since our last Review were 41s. 6d. on 5,476 qrs., 41s. 7d. on 4,690 qrs., 43s. 2d. on 6,494 qrs., and 44s. 5d. on 4,201 qrs.

An improvement in the article of peas has been steadily maintained through the month, but this has not been the means of finding any increased quantity in the hands of the farmers; indeed, less and less nearly every week has been returned, and few more samples appear likely to come forward regularly the remainder of the season. Some small parcels have been brought in from the North of Europe, and these have gone off at advanced rates almost as fast as they have come in, a Government contract having cleared the market at one time of all the fine boiling qualities; and there are now not many on sale of any description. From Canada we are not likely to get our usual annual supply; the article being wanted for home consumption, and commanding a high price, will prevent the merchants buying freely for exportation. The weekly averages have been 39s. 2d. on 834 qrs., 38s. 7d. on 512 qrs., 40s. 2d. on 557 qrs., and 42s. 4d. on 426 qrs.

After we had experienced a cessation of demand for seed, some refreshing showers fell and brought forward a few buyers for closing the sowings of cloverseed, trefoil, and tares, when prices were rather enhanced for each of these articles. Of the two first, stocks are much reduced. English red held out wonderfully well, and it was only at the last that any small lots could scarcely be met with, and the importations of foreign have throughout the season been of the most trivial character; whilst of white, from Hambro', there has been a fair quantity, which, just at the opening of the navigation, commanded very high prices, and of this description a fair quantity is left over. Latterly there has been a speculative inquiry after it; the continued frosty nights late into this month having materially injured the growing crop, and high as prices still range, considering the season closed, some parties are anxious to hold over stock by way of investment, as from the reduced quantity on the continent it might turn out well, and command very high rates next season. As regards trefoil, there are only a few parcels of French left over, and these run of so inferior a quality as to give no encouragement to new buyers securing any to hold over; and it must consequently remain on the hands of the importers for next season. The article of tares was accumulating fast, and prices tended down so much as to be attracting attention for feeding purposes and to hold over, when after the rains fell the demand improved, and prices braced up fully 4s. per qr.; thus checking the speculative inquiry, and keeping out of the market such buyers as had previously been coming forward for this article, and they will be kept out of the market until a decline again takes place, to bring prices down to a safe rate.

The imports of foreign grain for the month ended the 30th April, as published in the *London Gazette*, of the 18th May, were 306,519 qrs. grain, and 107,794 cwts. flour; against 852,023 qrs. grain, and 514,773 cwts. flour the corresponding month of last year. The different articles stand thus:—

		1854.	1855.
Wheat	qrs.	476,111	128,401
Barley		63,449	16,451
Oats		121,624	59,728
Rye		328	—
Peas		6,094	1,849
Beans		20,911	11,848
Maize		163,490	88,741
Buckwheat		16	1
Total		852,023	306,519
Flour	cwts.	514,773	107,794

This great difference will cease the next month, as the large spring shipments from the Baltic will have arrived, and will most probably be fairly kept up for two months, but after that period the imports will no doubt greatly fall off and be again on a very moderate scale; although some parties fancy we may get supplies from the Danube. This, however, is problematical, as the neutral vessels allowed to bring corn from Galatz and Ibrail must go to some port in the country to which they belong, and their cargoes must be owned by a merchant of the same nation, and afterwards *may* be allowed to proceed to Great Britain, if her markets are sufficiently encouraging for all the additional expenses of a circuitous and lengthened voyage.

At nearly all ports of the North of Europe prices of wheat have advanced considerably, the stocks having been much reduced, and no great addition is expected from the interior previous to another harvest. At Danzic fine high-mixed wheat weighing 60 to 61lbs. is worth 75s. per qr. free on board, fine-mixed 73s., and 60lbs. 70s. to 71s. Five vessels had been chartered for London to bring 4,400 qrs. at a freight of 4s. 6d. per qr.: two vessels for Leith and Grangemouth at 3s. 6d. to 4s. per qr. There have been limited supplies brought forward at Rostock, and good 62lbs. wheat cannot be shipped under 73s. to 74s. per qr., and 61lbs. at 71s. per qr. A very large business has been transacted in grain at Hambro'; prime Mecklenburg wheat 61½lbs. to 62lbs. has been sold at 72s. per qr. free on board, and some choice lots have reached 73s. per qr. Other articles have commanded enhanced rates: 53 to 53½lbs. barley 29s. 6d. per qr. free on board; 38½lbs. oats have realized 23s. 9d. per qr. free on board. In Holland, taking quality into account, prices are very high—red

Upland commanding 74s. to 75s. per qr., secondary sorts 72s. to 73s., and middling to inferior sorts 71s. per qr.; and rye was in demand for shipment up the Rhine at advanced prices. The French markets are in a somewhat anxious state; prices of wheat in most departments are on the advance. Flour at Paris has improved in value about 2s. per sack. The price of bread is no longer ordered to be sold under the fixed rate on striking their averages, which has so long been the case, the Government paying the loss at the public expense, but is disposed of at the *mercuriale* return, being now considerably higher than the recent price; and although this is not for the moment important, it points to serious consequences for the grain trade in both kingdoms. The markets in the United States have been sent up very high, previous to the spring supplies coming from the interior, and stocks for their own consumption are much reduced. At one time fine white Southern wheat was run up to 95s. to 98s. per 480lbs., ordinary Michigan to 94s., and for Southern red 84s. per qr. had been obtained: these prices were all paid at New York. Fair arrivals are expected towards the end of June; and public opinion there indicates the probability of a decline towards that period. At the same time, judging from the quantity deemed likely to arrive previous to another harvest, the undoubted scarcity which exists even in the produced sections of the United States, as evidenced by purchases of wheat in Chicago for St. Louis on the Mississipi, and the sale at New York of 1,500 qrs. Canadian wheat to arrive, for the southern States, whence they usually draw their supplies, opinion favoured a gradual reduction only from their present rates up to the end of August. Flour was very high, and had been run up to 48s. and 49s. per brl. From Canada the advices were very important. Telegraphic reports from Quebec had arrived at New York, announcing the arrival of several coasting vessels from ports further down the river to procure flour, as the country people in those localities were in an alarming state of destitution. At Toronto there were about 40,000 qrs. wheat and 25,000 brls. flour, but decent samples of the former were worth 69s. to 75s. per 480lbs., and the millers were perfectly wild in their ideas, asking 42s. to 44s. per brl. for flour. Indian corn retails at 50s. per 480lbs. free on board at Montreal. From New Orleans it was stated that they had not experienced a drop of rain for twenty-two days, and serious fears were already entertained that the coming crops of all kinds in that latitude will be injured. The receipts of flour had materially fallen off, and holders were gradually advancing their pretensions.

Although at intervals many showers have fallen throughout the month, and at one period a continuous rain of fourteen hours had been reported, yet, on the whole, warm genial weather has only been experienced during two or three days, and there has been a great want of sun, and mostly the temperature has ranged low night and day, that the progress has not been as important in the growth of either grain or grass as is usually the case this month, and we have many and loud complaints of the wheat plant on all light soils. From Suffolk our friends say—"Seven-tenths of the fields on the light soils have more or less misplanted, some seriously so, many having been ploughed up. The harvest must be certainly a full month later than usual, even with warm and forcing weather, as very few fields would yet hide a hare, while in many, the freehold is as bare as is usually the case in February and March. Spring corn looks exceedingly well, but winter-sown beans are much damaged." Other accounts are equally unfavourable, particularly from the Fens of Lincolnshire and Cambridgeshire, where there is a great want of plant and no promise of even a moderate crop. From all we can collect, and after another month's experience, we we are now apprehensive of a September harvest this year, which might prove very disastrous for the country in its present position, every additional week as to consumption being of the greatest consequence, and until this year's crop has been secured there may be many important changes in the trade, and our agricultural friends will, no doubt, derive considerable benefit therefrom; but so long as they can supply the markets with the liberality they have done since last crop was secured, they will have it in the power to check any very extravagant prices, and get out of their stocks at quite satisfactory rates.

IMPERIAL AVERAGES.

For the last Six Weeks.

	Wheat.		Barley.		Oats.		Rye.		Beans		Peas.	
Week Ending:	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.
April 14, 1855..	68	4	31	1	25	10	39	11	41	2	39	2
April 21, 1855..	68	8	31	5	25	10	38	11	41	5	36	10
April 28, 1855..	68	4	31	6	25	9	40	10	41	6	39	2
May 5, 1855..	69	5	31	8	26	0	38	0	41	7	38	7
May 12, 1855..	73	4	31	10	26	11	40	9	43	2	40	2
May 19, 1855..	76	1	32	5	27	9	44	3	44	5	42	4
Aggregate average of last six weeks	70	8	31	7	26	4	40	5	42	3	39	5
Comparative avge. same time last year	78	9	37	1	29	9	50	8	49	8	46	6
Duties........	1	0	1	0	1	0	1	0	1	0	1	0

HOP MARKET.

BOROUGH, Monday, May 28.

We have no material alteration to note in our market since our last report. A good demand has existed during the week, particularly for Sussex growth, the stock of which is now reduced to a very small compass.

POTATO MARKETS.

BOROUGH AND SPITALFIELDS.

Monday, May 28.

Very moderate supplies of potatoes have come to hand from all quarters since Monday last. To-day the show of samples was limited, and the trade ruled tolerably firm as follows:—York Regents, 120s. to 160s.; Kent and Essex do., 120s. to 150s.; Scotch do., 110s. to 130s.; do. Cups, 100s. to 115s.; Blues, 95s. to 110s.; Lincolns, 105s. to 120s. per ton.

ENGLISH BUTTER MARKET.

London, May 28th.

Our trade has become dull at a reduction in price of 4s. 6d per cwt.

Dorset fine, new milk	98s. *to* 100s. *per cwt.*
Do. middling	88s. *to* 90s. „
Fresh	8s. *to* 12s. *per dozen.*

END OF VOLUME XXVII.

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